





# AT&T will ditch local phone companies to focus on computers

by Howard Kartco  
US telephone giant AT&T has been freed to engage in videotex and other advanced data communications services unregulated by the American government. This follows from last week's announcement that a settlement has been reached in the seven-year-old antitrust suit brought about by the Justice Department.

The most immediate effect will be that AT&T will divest itself of its 22 wholly-owned local phone companies representing two-thirds of its total assets.

But the ruling leaves the way clear for Baby Bell, AT&T's newly set up data processing subsidiary, to move further into computerised information services such as videotex, and it could soon represent a formidable force in the field.

AT&T consists of the Long Lines Department which provides long distance service; Bell Labs, its R&D arm; Western Electric, the manufacturing arm; and some 23 other companies throughout the

US which provide local service to subscribers. There are also more than 1,500 telephone companies throughout the country, which range in size from a few hundred subscribers to several hundred thousand.

Under the terms of the agreement, which is formerly called a consent decree and replaces the historic consent decree reached in 1956, AT&T has six months to file a plan for reorganisation, and then 18 months to achieve it.

The full effect of the agreement will not be known for several months, as lawyers for firms in the computer and related industries pore over the agreement looking for implications and opportunities.

This week most competing firms remained uncertain about the net effect on their business. The US government filed its suit seven years ago, alleging that the size of the \$120 billion company tended to stifle competition. The current agreement is thought to be the biggest anti-trust settlement

since the government broke up the Rockefeller owned Standard Oil Company in 1911.

AT&T agreed to the settlement partly out of concern about legislation currently pending in the Congress that would have been fairly restrictive, a Communications Rewrite Act which passed the Senate a few months ago.

In the House of Representatives, Representative Timothy Wirth of Colorado had introduced an even more restrictive Bill.

At the moment far more questions remain asked than answered. For example, where will the R&D effort and the intricate standardisation of phone system practices come from?

Certainly the net effect of this development seems to be to increase competition and possibly innovation, since AT&T will no longer have the formidable clout it once used to forestall any developments not to its liking.

● AT&T takeover in Ireland? — back page.





# Major EEC study goes to UK consultancy

by Donald Kennett

MAKING a good start to Information Technology Year, a UK company has won a major EEC consultancy contract that will lead to an investment of tens of millions of pounds in communications equipment between next year and 1990.

Langton Information Systems has won the contract, worth £180,000, which is for the next stage of the European Commission's plans to build a private communications network, called Insis, to link the institutions of the European Community and relevant organisations in member countries.

Team leader Graham Taylor said that Langton was the only company to bid for the contract as part of a multi-national consortium, despite the Commission's publicly stated preference for them. (Multinational companies on their own do not count.)

There were great difficulties in setting up and running these consortia, said Taylor, particularly when they were consultancies, because consultancies tended to be "a pretty confident breed".

"But we know that the consortium approach won't," he added. Langton will team up with Danet in West Germany and a company in France which has yet to be confirmed. In the UK, it will be joined by Communications Studies & Planning.

The consultants' report is to be completed by November. It follows a one-year study by Pactel (on its own) into the basic communications requirements of the Commission, and a six-month study by Langton into the probable development of telex text communication services in Europe.

Pactel's report has been presented but has yet to be formally accepted and therefore published, while Langton's telex report is to be presented this month.

The Insis report is to deal with functional aspects of civil servants' work, one third of it on the requirements for storing, retrieving, broadcasting and exchanging text, taking account of the need to work in seven or more spoken languages, and the remainder providing an implementation strategy to meet those requirements, with a list of applications and their associated priorities.

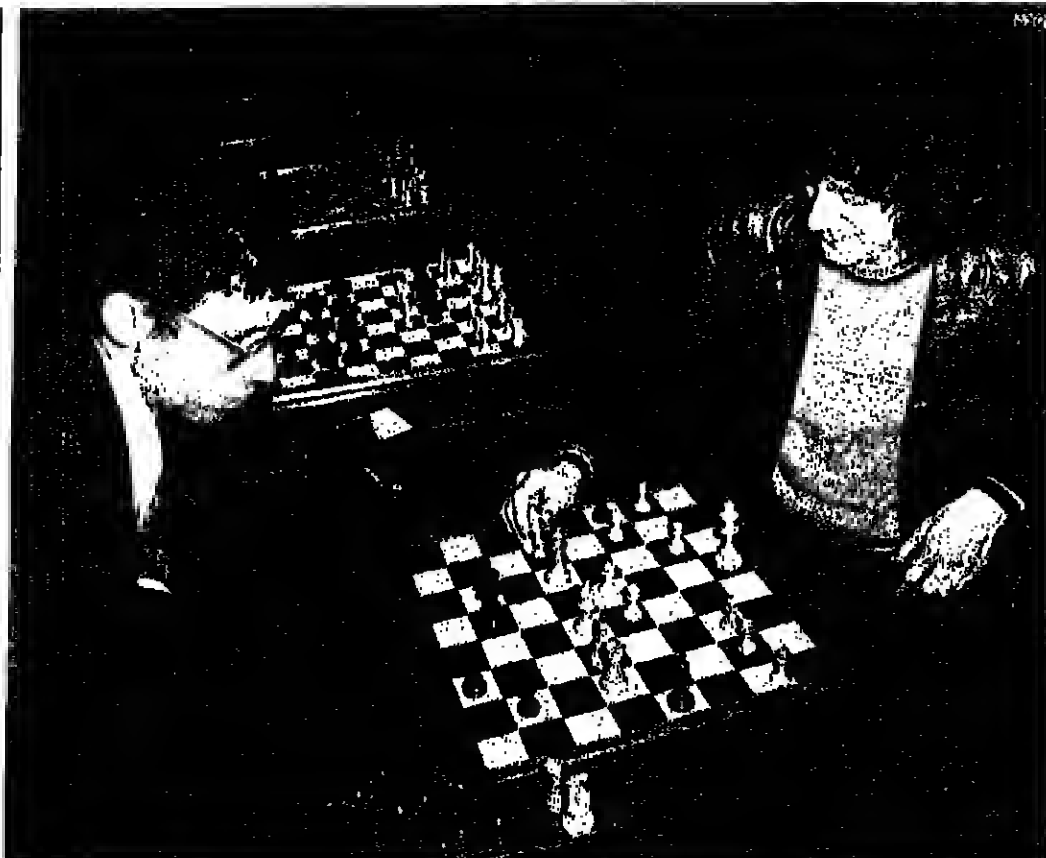
Text communications will be the dominant subject of the study, with telex and videotext attracting particular attention as transmission media, while facsimile transmission and teleconferencing will be of secondary interest.

When the report is accepted, the Commission will start buying equipment and placing contracts to implement various systems.

Between this year and 1985, telex services are due to start up all over Europe and one of the main problem areas will be interconnecting them.

Sweden, which has become the first country to launch a pilot telex service and which plans a full service by the end of the year, is basing its service on a circuit-switched data network. Germany, another pioneer in the development of telex, and Italy, are doing the same.

British Telecom, whose service is due to start in April, will use both the telephone network and the PSS packet switched network, while the remainder of Europe is expected to use packet switched networks.



Dr John Nunn (right) and International Master David Levy ponder over the new solutions to an old Russian chess problem, which were exposed by the SciSys chess computer.

## Chess champs put in shade

by Philip Hunter

THE current world champion of commercial chess computers splashed mud on the boots of eminent international chess experts when it recently exposed a flaw in a prize-winning chess competition.

It found that the problem set by leading Soviet chess problem expert Leonid Zagorjko, which won first prize in a competition set in 1972, has more than one solution.

Chess problems must have just one solution to win such a competition, and a distinguished panel of judges was unable to find a solution other than that proposed by Zagorjko himself at the time.

Nine years later, after the problem has been published worldwide, as many as three solutions have been revealed by the computer, Chess Champion Mark V, sold by SciSys Computer of London.

The embarrassing exposure happened at a man versus machine chess problem-solving contest at Brighton, sponsored by SciSys where Mark V was competing against International Master John Nunn, who is the reigning British chess problem-solving champion.

Chess computers are ideal for problem-solving since their inability to look more than a few moves ahead is not normally exposed.

Mark V was faster than Nunn on four of the other five problems set at the competition.

Mark V was programmed by computer chess expert and International Master David Levy, who is joint director of Philidor Software which is dedicated to compiling chess programs of ever greater sophistication.

In common with other commercially available dedicated chess computers, Mark V can play 12 games simultaneously. On this point it has yet to catch up with humans. Former world champion Alekhine once played 60 simultaneous games blindfold. He won 59 of them and drew one.

## SALES BRIEF

### US bank deals with Logica

BANK of America has organised a joint systems development project with Data General, Reuters and Logica to develop a dealing room information system for its European branches.

Based on a Data General Eclipse mini, the system will incorporate keyboard-controlled video switching equipment developed by Reuters which will enable each dealer to control several VDUs from a single keyboard, calling information facilities from different sources.

### Telex system

MERCHANT bank Credit Suisse First Boston has ordered an ITT 6100 text communication system to handle telex message transmission and internal distribution in its London office. The system uses a 20 Mbyte disc store. It allows users to send telexes to groups of up to 40 addressees by typing a single four-digit code. Up to 250 groups can be defined and short codes can also be used to dial to a further 749 frequently-used telex numbers.

### Fault-finder

SYSTEME has placed a £400,000 OBM order with SE Labs of Feltham for SE 8800 46 inch per second tape transports with five of its larger models of minicomputer. Systeme previously supplied a tape transport made by Digi-data. The SE Labs transport has a built-in controller which provides file search facilities, as well as aids to fault diagnosis.

### Train information

TELSIGN, the main contractor for the £250,000 passenger information system to be installed at St Pancras station at the end of this year, has ordered a floppy disc-based 16-bit 128 Kbyte Computer Automation Naked Mini 4/30 and commissioned software for it from Vaughan Systems of Ware to manage the timetable information and communicate with indicator board controllers and other devices.

### £25,000 software

SIX-MONTH-OLD Pan Computer Systems of Sheffield, the systems house subsidiary of Sheffield Brick, has won two contracts for software additions to previously ordered systems based on Data General minis. The contracts, totalling £25,000, cover estimating and costing programs for Leeds-based shopfitters Mason for Leeds stock control, invoicing and sales statistics for fuel distributor A. D. Osler.

### First orders

PHILIPS has received the first two UK orders for the P4500 office information system it launched in November. Jewsons, the builders merchant subsidiary of International Timber, placed a £111,000 order for a system with 12 workstations for its head office in Norwich; and Glasgow-based M.A. Systems Management, has ordered a £50,000 system.

### Traffic control

PLESSEY Controls is to supply an urban traffic control system to Essex County Council. The contract, worth £209,000, is for a system based on a centrally located computer capable of controlling up to 250 sets of traffic signals. Deliveries will start in late 1982.

### Growing to B900

NON-STICK, kitchenware maker Tefal of Langley has replaced its year-old Burrells B92 with a 1 Mbyte B900 to cope with its 40% growth last year. The £75,000 B900 will support 13 VDUs in offices around the country. Existing software was transferred from the B92.

# Govt under fire for going to US bureaux

by David Craver

THE thorny question of whether the government should show preference in buying from UK computer companies has been raised again. Revelations that the Department of Environment continues to spend increasing amounts with US-owned time sharing bureaux Geisco and Comshare to calculate local rate support grants have also called into doubt the ability of UK firms' ability to do the job.

But suggestions in the Financial Times that UK bureaux do not have sufficient memory capacity or software facilities have been dubbed a "red herring". BOC Datasolve, Baric, and CMG all maintain that they have the capabilities to meet the DoE computing requirements, and it is probable that companies like Centre-file and Scicon would also not rule themselves out.

The choice of Geisco, the software arm of the US General Electric Company, was based on the company "having the right equipment".

UK firms using ICL equipment don't have the right software," said the spokesman. But marketing manager Chris Gent of Baric, the ICL and Barclays Bank subsidiary, disputes that, and says Baric "can do that kind of work, and has been doing it".

Baric was invited to tender for the DoE job, he said, and he believed the quote to have been competitive.

The choice of Geisco, and the generally large amount of government work being done by overseas bureaux may be historical, Gent

thinks, in that UK bureaux were late to develop advanced networking capabilities for online jobs. But the UK has now caught up, he says, with Baric, which has had a reputation as a batch bureau, recently making a "huge investment in switch to network systems."

A letter to Information Technology Minister Kenneth Baker is out its way from BOC Datasolve managing director Chris Wood, who asserts that while BOC might have been somewhat lax in the past in grilling government tenders, it certainly had the computing power, software capabilities and reliability for the DoE work.

Wood is "more confident of the future", and says BOC is now much closer to the Central Computer and Telecommunications Agency, the government body which oversees computer purchases.

CMG group director Bob Fawcett points to the difficulty of fashioning government buying practices, which he describes as a "moving target".

"Give me a chance to quote, that's all I ask for," he adds, saying he was never asked to tender for the DoE contract.



WOODS... Secret plan to handle a large sales force.

## £63,000 for Key

by David Craver

A COMPANY which claims to have a different way of handling a large sales organisation so as better to meet the demand for small computers is getting £63,000 backing from Technical Development Capital, a division of Industrial and Commercial Finance Corp.

Roger Woods, an ex-Philips Data Systems sales manager who started Key Computers 13 months ago, was not willing to reveal his new system for fear of giving away details to his competitors. But Woods does expect his company, which is an OEM based in Poole, Dorset, to show rapid expansion with turnover for next year projected at £750,000.

As part of the financing deal with TDC, Key is breaking off an arrangement with software house Quadrant Computer Services which was initiated only eight months ago. The separation is an amicable one, says Woods, and Quadrant will continue to supply software.

TDC will take a 30 per cent stake in Key Computers. TDC parent IFCG is part of the Finance for Industry Group, set up in 1945, and shareholders are the five major clearing banks (85 per cent) and the Bank of England (15 per cent). If Woods' plans for Key are successful, there is expected to be more money forthcoming in 12 months' time.

## GEC puts robot on US market

by Boris Sedacca

GEC's new factory automation division is about to launch its Compam paint-spraying robot into the US market as part of its two-pronged strategy to compete with what it regards as the pre-war world leaders in robotics, General Electric in the US and Hitachi in Japan.

According to Alan Davis, director and general manager of GEC's Factory Automation Systems Technology (FAST) division, the group has been in automation for a number of years through GEC Electrical Projects' involvement in the steel and process industries, and now wants to extend its operations to manufacturing in general. "The first stage of our strategy is product competition on an international scale with our Compam robot. We are currently setting ourselves up to market the system in the US."

"Our main markets will be overseas rather than in the UK in the case of the paint-sprayer, and we have already begun marketing it in Germany. The US and Scandinavia will follow," he said.

The company will also push the robot into home markets to allow the British mechanical handling and machine tool industries to enhance its products. Development of the second stage is to compete for large turnkey projects in home markets.

General Electric in the US and Hitachi in Japan are our main competitors in factory automation at the moment, but the market potential is big and I do not expect that they will want to come into the UK. We can handle projects of the kind they are in conjunction with GEC Electrical Projects.



Alan Davis, director and general manager of GEC's Factory Automation Systems Technology (FAST) division, is shown in a suit and tie, smiling.

## Accounting on micros

by Boris Sedacca

AN accountant's package which can produce full accounts and analysis from a brown paper folder of invoices and cheque stubs has been launched by Manchester-based MAP Computer Systems. The suite of accounting programs includes a variety of microcomputer supporting the CP/M operating system.

Managing director Glyn Rigby, himself an accountant, spotted the potential for an incomplete records system and has added to the system so that it now includes a full accounting requirements, including a time recording facility to help accountants manage and charge their own time profitably.

We encourage users to give us feedback on the package and incorporate the most common requests into it," Rigby explained.

## Ulster rates system 'a milestone for CAP'

by David Craver

A BIG turnkey project with the government to supply a rates collection system in Northern Ireland has given impetus to efforts by UK software house CAP to become more of a systems contractor.

The order, which has an estimated value of £1 million, also provides some evidence that the government's buying arm, the Central Computer and Telecommunications Agency, is turning more towards systems houses to supply its computing requirements.

For CAP, the system will mark "something of a milestone as a government contractor," says Ken Crews, manager of Government Business Group. He admits that until now CAP has not pressed for government business in turnkey systems, with this emphasis going on consultancy services.

But Crews says the government is beginning to show a greater interest in turnkey systems.

A spokesman for the CCTA comments that "We certainly now involve systems houses more in some of our procurements" and "We positively invite them to come forward with proposals". There has, however, been no general change in policy, he adds.

The system for the Northern Ireland rating division involves an IBM 4331 and a network of IBM 3600 financial terminals running under CICS communications software and DLI database management system. Installation in Belfast will be in August with operations planned for the 1983 financial year.

The other major bidder for the contract, which was advertised in the EBC Journal, is believed to have been ICL. Crews says CAP could have done the job on ICL equipment, but he was not too happy with the ICL alternative because of ICL's inability to handle a large number of terminals at reasonable cost.

## NatWest joins govt 'small firms' scheme

by Boris Sedacca

THE National Westminster Bank has identified itself as a source of finance to small businesses seeking funds under the government's small firms loan guarantee scheme.

Barclays has made considerable headway in this area, said National Westminster is a relative newcomer to the scheme, which allows banks to get cover from the government for 80% of a loan to a user with insufficient assets. The borrower pays three per cent over the

standard loan rate to the government.

National Westminster's participation in the scheme came to light when it loaned £20,000 to Applecastle, a used computer equipment dealer which began trading last week.

Peter Gordoo, managing director of Applecastle and previously an independent consultant, approached National Westminster in the City last September without even having an existing account with the bank.

## Logabax moves up-market

by Jack Gee

LOGABAX, the peripherals firm which was salvaged by the French government and Olivetti last summer, is embarking on a policy of moving up-market to big, State-owned and private firms from the small and medium-size ventures which used to represent most of its customers.

Managing director Jacques Dumas, former head of Sperry Univac for France, revealed this switch in Paris when he predicted that Logabax, now 65 per cent under Olivetti ownership and 35 per cent owned by Saint Gobain-Pont à Mousson, will be making a profit in 1983.

Dumas said that since the restructuring of Logabax the staff had been slimmed down from 1,500 to 987 by shedding 30 per cent of French personnel and closing its foreign subsidiaries.

The move up-market is reflected in Logabax's decision to stop manufacture of bottom range products such as the LX100 line printer, the improvement of the LX200 and increase in capacity of the LX500 and 6000 ranges.

## IBM buys rights to French CAD system

by Jack Gee

IBM has bought worldwide rights from the French Marcel Dassault aircraft conglomerate to market its sophisticated Catia system for computer-aided design and manufacture.

Although IBM has already acquired rights to about a score of French software packages, this is the first time it has decided to market them on a global scale.

Dassault Systèmes, a subsidiary of the vast Dassault empire, won IBM's favours for Japanese systems. Boeing Aircraft Corp has already chosen Catia for computer-aided design. Dassault is confident that a similar choice will be made for mass production of the McDonnell Douglas F-16.

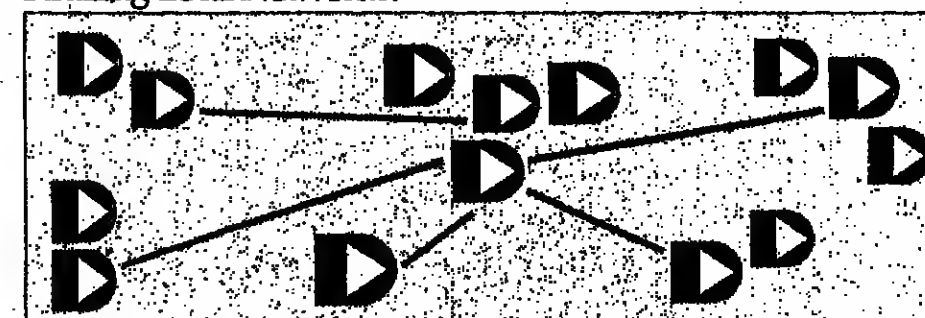
Catia is the result of 15 years' research. Dassault has put a team of 500 workers into the project, whose development has cost 25 million francs (£2.5 million). Customers include Daimler Benz and BMW.

Besides McDonnell Douglas, Lockheed and Honda are also negotiating for Catia rights with Dassault.

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ADAMS... Bank Holiday demo sales.

## 'Quirk of fate' results in forecast sales of £4m

by Maggie McLeining

SOFTWARE sales to Japan worth over £2 million are anticipated this year by Micro Focus, the company whose objective is to grow 300% during 1982.

Paul Adams, the international business manager with Micro Focus who won a Super Software Seller award for sales of CIS Cobol to the US and Japan, says that he was originally recruited to ICL in 1979 to head up sales in the US, and that it was only a "quirk of fate" that took him to Japan.

"About two years ago, Alao Benjamin, then with the Computer Services Association, organised an outward mission of Japanese manufacturers to discuss software processes. I managed to persuade them to come to a demonstration on a Bank Holiday Monday, which was their only free day, and about 20 people turned up and photographed and recorded everything."

Among the companies represented at the presentation were

Fujitsu, Hitachi, Oki, and several software service organisations. Surprisingly, Micro Focus has only recently achieved sales to Hitachi, in spite of the interest shown at the time.

"The Japanese are very slow to deal with," comments Adams. "If you hurry them they feel there is something underhand about the deal."

Portability is another major factor, as companies like Hitachi use a wide variety of equipment, and also paying attention to implementation details. "Hitachi, Mitsubishi and Fujitsu spend millions developing their own software, then buying new technology to implement it," comments Adams.

Software must also be adaptable to accommodate the Kanji, Hyrogana and Katakana alphabets for the Japanese to use in business application software development. In the past, they have concentrated on engineering and process control and are strong in these areas, but weak on the business side.

## Japanese allege US trade discrimination

by Kevin Cahill

A MAJOR diplomatic row is currently looming in Japanese-American relations as two major Japanese computer manufacturers, Hitachi and Fujitsu, allege that the Americans are using the strategic embargo as a way of giving preference to American companies selling computers to China.

Late last year Burroughs announced that it had secured a huge \$5.4 million order for a networking system, including two B7800s (Burroughs' biggest machine), to be delivered to a company in Beijing (Peking), in 1983 and 1984.

All computer systems supplied to a Communist country must be processed through a military body in Paris called the Co-ordinating Committee for Export Control. It includes representatives of all the

NATO countries, but is dominated by the Americans.

In the middle of last year this committee blocked the delivery of a Hitachi M 180 destined for a university in Beijing on the grounds that it might be diverted to military uses.

The Burroughs application for an export licence is still with the committee, but the American Treasury secretary Donald Regan recently singled out the Burroughs deal as an example of the kind of technical assistance American companies should be giving to China.

Burroughs has taken this as a sign that the administration will clear the sale through. This is despite the fact that the Chinese company for which the network is des-

igned, Hua Fung, is a bureau which will supply time sharing to both Chinese commercial companies and government ministries.

Hitachi officials speaking in Tokyo said they understood that the pressure in the CGEC to limit the sale of Japanese computers to China was coming from the US Department of Defence, and was in direct conflict with the State Department policies which were to allow the sale to proceed.

Burroughs is a major supplier of computers to the American military, and Japanese officials who did not wish to be named said that the military pressure to limit sales was a "tangled" in the relationship between certain computer companies and the US military.

## Hewlett-Packard adds to top end of its HP1000 technical family

by David Craver

A TOP-END real time minicomputer has been announced by Hewlett-Packard for its family of HP1000 technical computers.

The release follows hard on the heels of a major product launch for its 3000 series of commercial systems, and is part of H-P's strategy to become the world's number one supplier of systems to the manufacturing community.

The new HP1000, called the Value65, is still a 16-bit machine, but it has virtual memory for data capability, which "pitches it at applications where you need 32-bit architecture for handling large programs," according to a spokesman.

H-P believes the virtual memory is the first on a 16-bit computer, and it allows users to access data arrays of up to 128 megabytes located either on disc or in main memory. The virtual memory is a feature of a new RTE-6VVM operating system, which also has a new scheme for segmenting programs.

The HP1000, like the new 3000

series, can be seen as a stepping stone towards the future release of a 32-bit machine. While H-P maintains that the 16-bit market in the technical sector remains very big, it has developed a 32-bit processor on one chip which will eventually reach the market.

The main stumbling block to the release of a 32-bit machine is H-P's commitment to forward compatibility for its existing customers, which entails a major rework of operating systems for both technical and commercial computers.

In the meantime, virtual memory on the 1000 allows users to do most of the same tasks as a 32-bit machine at what H-P says is less cost, and the new top-end HP3000 series 64 announced in October has a 32-bit data bus and memory organised around a 32-bit word, as well as a dual Arithmetic Logic Unit performing 32-bit arithmetic in a single cycle.

The Value65 is primarily for use in graphics, computer-aided design, and large computation-type applications. It can have one to two megabytes of main

memory, and has a new Fortran 77 compiler, a new Pascal compiler, database management software, and two and three dimensional graphics software.

A bundled one-megabyte system with all the software packages costs £42,757, while a two-megabyte system costs £48,706. With the RTE-6VVM operating system up to 255 physical devices, including terminals and peripherals, can be supported.

The 65 will also support the new disc drives that were released with the 3000 series. These include 16, 27 and 64-Mbyte Winchester discs with built-in streaming-mode tape cartridge for backup.

### MSA acquisition

US financial software house Management Science America has formally declared its intention to take over Xerox's Arista Manufacturing Systems division early this year. Arista produces software such as inventory record control for manufacturers.

## Firms buy police info

by Philip Hunter

COMPUTERISED criminal information can now be bought by private companies to the US following relaxation of privacy laws, and one large company already has access to listings of lost or stolen vehicles to check ownership of cars parked in its lots.

A company could, in theory, gain access to full criminal records, although such an application from the First National Bank was rejected because it was felt individual freedom would suffer too much.

The amendment in the law, which originally prohibited all

outside access to federal information, was the result of complaints from press associations and was otherwise intended to benefit computer systems dedicated to law enforcement applications. But this is certainly not the case for McDonnell Corp of St Louis, which has bought a terminal online to REJIS, the Regional Justice Information Service, for over £1,000.

The idea of police information being sold is anathema to many US journalists, on whose behalf the change in the law was made, and does not even win full support of the police, which readily admits the information is not always accurate.

## More councils use WP

USE of word processors in local government has increased fourfold in some departments during the last year, according to a survey by the local authorities computing committee (LAXSAC).

Of the 62% of authorities which responded to the survey, 79% are now using some form of word processing equipment, and a further 4% are awaiting either a decision or an installation.

The majority of applications are administrative, but there has been a dramatic increase in usage by leisure and housing services. Among documents produced are telephone directories and registers for the physically handicapped.

## 'Consult the workers'

THE answer to greater efficiency in industry is not new technology but employee participation in decision making, combined with better management, according to a report published by the National Economic Development Office, NEDO.

The study examined the industrial practices of the UK's main competitors and concluded that they have more streamlined management structures, more delegation of responsibility, more flexible shop floor work practices, and more worker involvement.

The example of the process plant industry is cited, where productivity is twice as high in Japan as in the UK.

## NEWS BRIEF

### UN picks World Comms Year

THE United Nations Assembly has proclaimed 1983 as World Communications Year. The purpose of the Year is to develop communications infrastructures, with attention focusing on co-ordination at a national level. The proclamation came after four years of negotiations.

To be funded by voluntary contributions, WCY 83 will be organised by the International Telecommunications Union, a UN agency. The goal of the programme is to ensure that communications are used to increase economic, social, and cultural development throughout the world.

### \$250m credit

A REVOLVING credit worth \$250 million over three years has been negotiated by Burroughs with a group of 16 US banks. Head of the group is the Chase Manhattan Bank, one of the three largest banks in the US.

The credit agreement replaces an existing credit line of \$150 million, and is not earmarked for any particular projects, but will be used for general corporate purposes. Burroughs has the option to convert the credit into a term loan at any time. The term loan would run from four years from time of conversion.

### Scottish first

STANDARD Life Assurance company has become the first business in Scotland to install an IBM 3081 large-scale mainframe processor complex with 16 Mbytes of memory, 16 channels and 7,500 Mbytes of storage on 3380 disc devices. The company says that the system generates enough heat to provide central heating for 20 typical semi-detached houses.

### Cheaper calls

CHARGES for international trunk telephone calls are to be cut by up to 33% in two batches, in February and May. British Telecom says that, while some cuts were made to long-distance call charges last November (when many increases were made to rental and installation charges), these cuts were delayed so that BT would be able to meet the earnings targets set by the government for the current financial year.

### BA satellite deal

THE £150 million contract to build L-Sat, the first of a new generation of large and powerful communications satellites for the European Space Agency, has been awarded to British Aerospace, which built most of ESA's earlier satellites. BA will lead a team of companies from all eight of ESA's sponsoring countries.

### DRI agent

THE government owned computer peripherals company, Data Recording Instrument, has signed its first overseas licensing agreement for its printers with Machinery Manufacturing Corp of Calcutta, India. The initial license, which will run over several years, is for the 6331 range of printers. Later agreements are expected to include the newer 8000 series.

### Network upgrade

THE 2,000-plus customers of Computer Sciences' Infont remote computing service, one of the largest international information networks, are being upgraded to larger computers. Sixteen Univac 1100s are being replaced by six 1100/80s, and the more powerful hardware is expected to be of particular value for financial modelling and simulations. It will also allow more users to access a common database, and give improved language and data management facilities.

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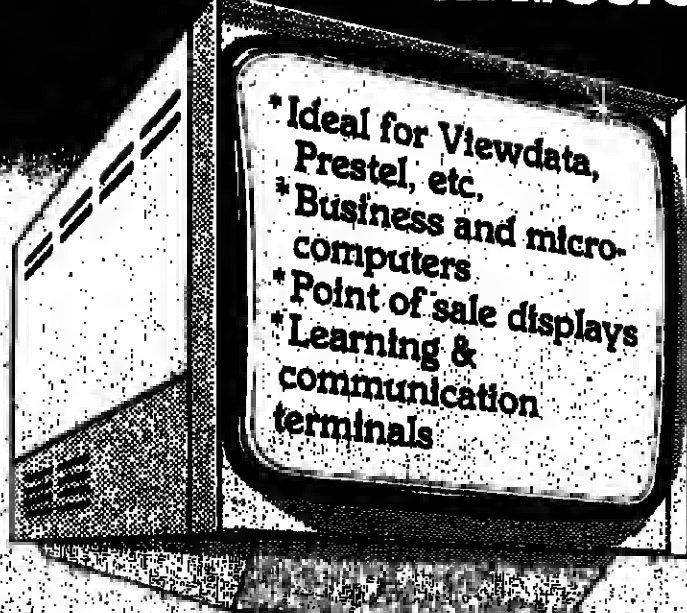
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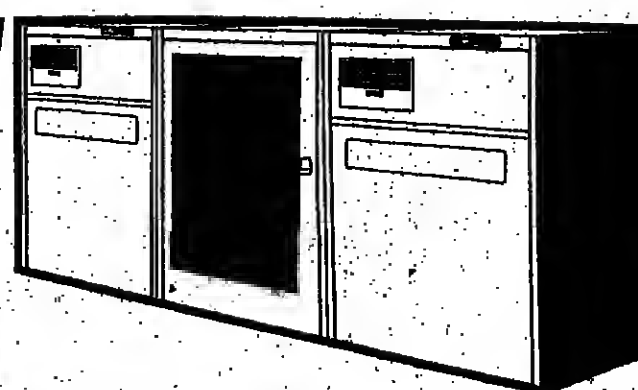
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## Freelance telephone suppliers lobby MPs

by Donald Kennett

THE government's plan which will require all independently sold telephone equipment to be marked as approved or not approved for attachment to the network has prompted the Independent Telephone Suppliers Association into a lobbying of MPs and Industry Ministers.

ITSA, whose 150 member companies for several years have sold assorted telephone handsets in defiance of British Telecom's monopoly (ostensibly for use on private telephone systems within a single site), now fears that its members will go out of business while waiting for independent equipment approval procedures to start operating.

There is evidence that while the buying public was previously willing to defy the monopoly, it now prefers to wait for the new approval procedures to start working before investing in more sophisticated telephones.

In an exchange of letters with Industry Secretary Patrick Jenkin, ITSA has criticised the government's attempt to protect British industry by placing in the liberalisation of equipment supply, arguing that overseas companies which already make electronic telephones can serve the UK market better than the main UK telecommunications suppliers.

Jenkin's letter points out that interim measures are being set up to enable equipment to be approved before new generally applicable standards are ready.

British Telecom, which is implementing the measures, says it has yet to receive any imported telephones for approval.

ITSA also complains that small businesses cannot afford to pay BT between £2,000 and £5,000 a time for approval.

## Second police authority picks Tandem failsafe system in £3m project

by David Crover

GREATER Manchester Police Authority will be the second in the UK to use Tandem NonStop computers if a police committee recommendation gets final approval. Logica is the prime contractor for the turnkey project, worth almost £3 million, which will provide a criminal record and message switching system.

The Manchester police committee has been working on the project for two years, with Pactal as a consultant, and confirmation that funds are available is likely to come in mid-February. But the pressing financial position of local authorities, which has left some doubt about the total funds available in Manchester, has placed a question mark over final approval.

Chief Superintendent Rankin, who heads the project team, says the system will be used both for administrative chores and for fighting crime. The main use will be by operational police officers, who will be able to make enquiries into the criminal records in a fraction of the time this now takes. Because of the effort involved in making checks with the existing manual system, enquiries now can only be made when the nature of the offence is sufficiently serious.

In smoothing administrative operations, the system will automatically handle much of the paperwork with New Scotland Yard.

The equipment, to be installed in phases, will comprise six Tandem NonStop 2 machines, Codex communications equipment, and Lynwood visual display units.

The first phase will involve a terminal network for message switching and the creation of an internal criminal records database. About 100 display units and 84 printers will be hooked up to the system. The command and control system will follow, and it is intended to link the system to the police national computer at Hendon at some stage.

The criminal records database will not be used for criminal intelligence, Rankin says. Only "scheduled" criminals will be included in the first instance. He anticipates that eventually all convictions will be recorded.

Northumbria was the first police authority to choose Tandem. That system is being put in by SPL, which also quoted for the Manchester deal.

The first phase will involve a terminal network for message switching and the creation of an internal criminal records database. About 100 display units and 84 printers will be hooked up to the system. The command and control system will follow, and it is intended to link the system to the police national computer at Hendon at some stage.



ASHBURNER... "A system which will upgrade realistically."

## Midlands group to introduce System 2800 micro range to UK

by Robert Parry

IN a move that echoes those of other microcomputer companies aiming to take their systems into the microcomputer domain, micro development and sales company CPS Data Systems of Birmingham has taken on UK distribution of the System 2800 range of microcomputers made by California-based Systems Group, a division of Measurement Systems and Control.

CPS Data Systems is the micro arm of IBM mainframe dealers and leasing specialists CPS Computer Group.

Nick Ashburner, CPS Data Systems' commercial manager, said: "We have been looking for a range of products to complement our own microprocessor product, Sauron, and we believe System 2800 fulfils this. Enhancements to be announced in the next few months will provide a system which will upgrade realistically with the user's needs."

The multi-user, multi-tasking System 2800 uses the Z80A 8-bit microprocessor and runs from a 64K twin floppy configuration up to a 512K system with 40 Mbytes of hard disk storage.

It is based around the Systems Group series of circuit boards for the S-100 bus - now standardised as the IEEE 696 bus - and is readily upgradeable through the range. Hardware for a usable basic system starts at about £4,000.

The decision to stick with an 8-bit machine, rather than moving to 16 bits, was a conscious one. CPS

feels that market forces will determine when to change over, preferring tried and tested machines with available application software for the moment. It is looking towards a market of users wanting good vendor support and a clear growth path, and who are prepared to forgo discounts to get this.

CPS supplies three basic building blocks for application software, covering word processing, relational database and communications aspects. Macros within these make it easy to produce bespoke software for particular users, according to engineering manager Richard Drayton.

Operating systems on the machines are an enhanced version of CP/M for single users and MP/M or Oasis for multiple users. The CP/M enhancements speed up disc transfers, by a factor of up to four or five according to Drayton, and give better error handling.

The main plank of CPS' marketing effort is the service it can provide, particularly in terms of customer support. Drayton puts much emphasis on the quality and quantity - of the documentation provided and on the ease of system expansion and maintenance. Application software support can be provided easily if the customer has the communications software.

For the future, Drayton sees the 40 Mbyte hard disc unit being available by the second quarter of the year, with 128K RAM boards appearing at about the same time.

## American office firm cuts pay

by Howard Karten

US office equipment maker AM International, plagued in recent months by business losses, announced last week that it was cutting wages for all employees by 8 per cent from January 1. And its workforce is to be reduced by 5 per cent.

As of January 31 a related round of cuts will effect AM International's overseas operations.

For the year ended July 31 1981, the company showed a loss of \$245 million. A spokesman explained that \$203 million of that was related to changes in the way the firm reports its income. The spokesman also attributed current problems to high debts and interest rates. For the year ended July 1980 AM International reported a net profit of \$5.8 million.

In the second half of 1981 AM International sold off five product lines including its micrographics unit and a line of point of sale systems for the food industry. The firm's Jacquard division (small business systems and word processing) is currently up for sale.

## Plessey moves into distributed DP

by David Crover

A FRONT-BMD communications processor, announced by Plessey Peripherals Systems, marks the company's move into the distributed data processing market. The Z80A-based Unitary Communications Subsystem is now available on the Plessey SYST 11/23, configured around the LSI11/23, and

the SYST 34.44, based on the PDP-11.

The UCS has already been test marketed in the US and Europe. By changing Read Only Memory firmware the UCS will support other communications protocols including IBM's HASP and 3270, and Univac NTR, U200, and U7400.

The UCS provides 32 Kbytes of ROM and 4 Kbytes of dynamic Random Access Memory buffering.

Plessey Peripherals in the UK is an offshoot of the parent company based in Irvine, California. It is an IBM specialising in Digital Equipment compatible products and other peripherals.

## SOFTWARE BRIEF

### PRO Pascal with strings attached

PROGRAMS written in UCSD Pascal may now be transferred to the CP/M operating system, using the latest version of PRO Pascal from Prospero Software.

"This should considerably widen our market," says Tony Hetherington, one of the founders of the newly-formed company. "The price of £190 for a single user remains constant," he added. "We are offering to upgrade existing PRO Pascal users for only a handling charge."

The feature which has made it compatible with UCSD Pascal is the string handling facility. This has been added to previous options, which include random-access file and 9-digit integer handling, and the ability to compile program segments separately.

### Mark IV release

RELEASE 9.0 of the high-level Mark IV Application Development System tool is now available from Informatics, the company that planned to be the only one with a full range of implementation systems for IBM and plug-compatible hardware and software. One of the 260 enhancements included in the new version is the Generalised Data Base Interface, which provides an application programmer with transparent access to such databases as Adabas, IDMS, Total, System 2000, IMS and others. Operating environments for GDBI include IBM 360/370, 43XX, 30XX and compatible systems under OS/VS, DOS/VS, DOS/VSE and CMS.

### Range extended

AN extension to Computer Associates' range of systems monitoring and accounting tools to analyse CICS performance has been announced. Included in the CA-Jasper/CICS package are the Wizard report generator and more than 20 pre-formatted analytical reports. The system completely replaces the IBM monitor for users of CICS/VS Release 1.5 and above.

### Top of table

THE combination of newly-available Basic-86 and the CP/M-86 operating system, both developed by Digital Research, will put the 16-bit 8086 IBM Displaywriter to the top of the micro table according to UK distributor Xitan Systems, of Southampton.

### Candle grows

OPERATIONS in the UK are to be expanded by Candle Corporation, the US-based performance monitoring software house, and it has formed a UK subsidiary called Candle Ltd. This coincides with the release of its BSRA/CICS monitor which analyses CICS response time problems.

### Cash flow solved

A SOLUTION to allow cash flow problems has been developed by Lion Micro Computers, in the form of a stock control package. MC claims that the EOQ - Economic Order Quantity - system requires no prior knowledge of computers, and that it can prevent under- or overstocking. The package retails at £105 + VAT, and will run on micro systems, including the ITT 2020 and the Apple II.

### New to UK

AN analysis sheet containing up to 6,000 figures may be manipulated or planning applications by the supercalc package, introduced to the UK by LSI Computers of Yoking. Available for most microcomputers running under the standard CP/M operating system, including LSI's own M-Two and M-Three models, Supercalc costs £190 + VAT.

## SOFTWARE FILE



PORTLOCK... "DP departments must become less isolated."

## US query language launched

THE US company Rapidata has brought into service a new interactive language for querying and updating structured databases. The XPLOR system was developed to make data stored in large complex structured databases easily accessible to the end user.

Rapidata's move to supply a query language indicates that bureaux and service companies are trying hard to keep in line with systems houses which are offering attractive end-user facilities.

According to Rapidata the language can be used in a custom-designed database or with one created with Rapidata's own tools, including XPLOR itself.

The language has been designed to be enough like English to make it easy for end-users to get what they need from the database without a great deal of computer expertise. There is a "help" system which prompts the user, and workspace utility which means that data can be retrieved from a workspace after the initial query rather than continually accessing the database.

## Software best sellers award

THE second Million Dollar Awards ceremony to be held in Europe is now open for entries.

The awards highlight software best sellers, and have been established for some years in the US. Judging takes place in the last week of January, and companies which have done over £500,000 worth of business on any of their products are invited to submit details to Keith Elliott at ICL on 01-493-8424.

This year's new Floppy Award will focus on the fast-growing microsoftware industry.

## WP package can proof-read

A PROOFREADER with a vocabulary of 90,000 words is the latest addition to word processing package Lex, supplied by Aoe Microsystems for use with Digital Equipment PDP-11s and Vax machines.

It can also be used to detect errors as words are entered, or to proof-read an entire document.

## Bringing micro power to the factory floor

by Claire Gooding

SURPRISINGLY, most computer power has traditionally been directed at on-profit making activities. "90% of computer spending is on the accounting, which represents 5% of company activities and leads to no profits," says managing director of Safe Computing Michael Portlock.

Safe Computing aims to change all that with its new product, Micro-SaFeS, designed to bring micro power to the factory floor.

"DP tends to see itself as a separate part of the company. DP departments must become less isolated and more oriented to the needs of the whole company," says Portlock.

He adds: "Micros are being sold to managers at different ends of the business. The prime motivation behind Micro-SaFeS is to cater for the production area. It has been neglected by DP but has enormous potential. Production has always been the poor relation."

Safe has invested £1 million in the development of the Micro-SaFeS package, backed by a £250,000 grant from the Department of Industry under the gov-

ernment's Software Products Scheme.

The micro version of the SaFeS production control system should bring a new class of customers within Safe's reach. The first step is to build up a network of dealers throughout the UK to market the micro system.

The first sale, to Rodman Development in Cheshire and worth about £3,000, was made by one of the agents, Alpha Business Computers. Already there are more in the pipeline.

"We intend to attack the UK first," says Bryan Neale, Safe's marketing manager for Micro-SaFeS.

The Micro-SaFeS system for small factories was based on Safe's successful production package of the same name for ICL System 10 and System 25 kit. The micro version was written in the MicroCobol tool developed by CAP, and is now sold by MPSP, which means that the software is totally portable between 40 different microcomputers, via the BCS operating system. Phase one of the system, already

available, includes the establishment of a parts master file, parts list, stock control, basic and extending costing, ABC and perpetual audit, routing and trial kitting.

The second phase, due to be released in August, incorporates sales and purchase orders recording, order analysis, material requirements planning, work-in-progress, capacity planning, shop-loading and variance monitoring.

Portlock promised changes for Chubb subsidiary Safe when he was appointed last summer, and admits that he has "driven this one hard" because it fits in well with the way he would like to see productions sold. Safe is now integrating its activities so that it offers a range of solutions, from bureau service to the micro package.

Plans for Safe Computing over the next three to five years include expansion to three times its present size, according to Portlock. The development is to come from overseas expansion, acquisition, and new product penetration of such areas as the micro market.

## Agent problems delay data dictionary sales

by Maggie McLening

DIFFICULTIES in finding a US agent have delayed sales of a data dictionary for the Hewlett-Packard HP 3000 series developed by Horsham-based software house Deltom Computer Services.

"There is no assistance available for small companies wanting to find agents in the States," said Zubin Kuston, a director of DCS. "It took us over a year to find

Independent Systems Support, which specialises in IBM equipment, but also has a lot of people working on Hewlett-Packard."

A potential five orders for the dictionary, which costs £4,250 for the Mark 1.4 version, are under negotiation in the US at the moment, while a second sale in the UK has been made to an as yet unnamed merchant bank in the City.

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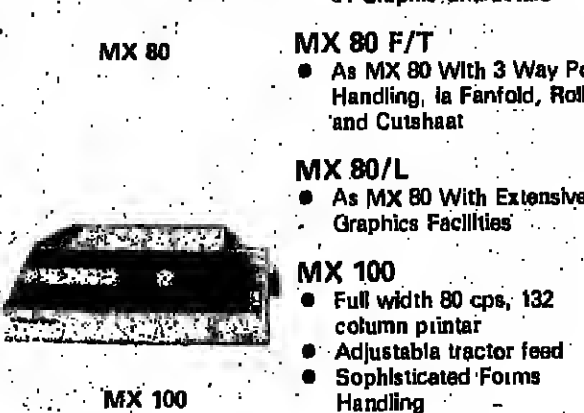
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# Brighter future for video cassette in disc back-up market?

VIDEO cassette recorders have outshone as back-up for hard disc based computer systems despite the high storage capacity and cheapness of the cassettes. High error rates have contributed to this reluctant acceptance.

Alpha Microsystems, California-based manufacturer of 16-bit microcomputers, is hoping to overcome the error-proneness of the technology by recording data redundantly and to popularise VCRs as a convenient means of providing back-up.

A VCR controller board, the AM-610, was introduced in the US in November and has been announced by the London-based arm of Alpha Micro.

The board allows standard VHS or Beta recorders to be integrated into any of the Alpha Micro computers. Up to 100 Mybytes can be stored on a four-hour cassette, with recording redundancy giving low error rates and error checking.

Alpha Micro's Dave Pheasant says blocks of data are normally recorded four times, though the user can select the level of redundancy.

File oriented back-up is provided by the controller board, with a directory allowing users selectively to record and retrieve random and sequential files. It is fully programmable and, when used with a time of day clock and a programmable recorder, can provide automatic back-up when no operator is present.

Pheasant sees the main advantages being cheapness and convenience compared with other back-up systems such as tape cartridges and streamers. However, he feels VCRs may be less acceptable in the UK than in the US, where prices are considerably lower.

An added complication facing Alpha Micro in the UK is that the board will work only with US standard VCRs, not with machines available over the counter in the UK. It is as yet undecided whether UK units will incorporate circuitry allowing use with UK standard VCRs or whether US recorders will be shipped in and sold as a package with the AM-610 board.

Despite Alpha Micro's claim to provide a "new concept in computer system back-up technology", using VCRs in this way is not so new. Corvus Systems has been selling its Mirror, a similar VCR controller, for two years.

According to George Gubas, Corvus product manager at Keen Computers in Nottingham, which distributes Corvus kit in the UK, Mirror was developed because many businessmen in the US already had VCRs, making it a cheap back-up system. There is some reluctance in the UK to accept the VCR, but the £500 Mirror sells well - and works with any UK machine with a camera input. Gubas estimates that about two-thirds of Corvus systems are sold with VCR back-up.

Blocks of data are copied four times and there is built-in verification.



TURNER... "A completely new program."

## 'What if' solution for accountants

WHAT do you do if you only have an 8K Pet and want to do "what if" projections on your accounts? One solution would be to write a program small enough to leave sufficient memory to carry out the calculations required once it was fed in - which is just what accountant Mark Turner of the Birmingham-based Cronite Group has done.

His program, called SimpliCalc, is written in Basic and contains 134 lines. It allows a user to set up a fixed size worksheet each time the program is run. A number of rows and columns are defined and the screen becomes a window on part of an initially blank sheet.

The size of the sheet depends on the available RAM and the density and complexity of the sheet contents, but as a guide an 8K machine could have 250 to 300 elements rising to 2,500 to 3,000 with 32K.

Cursor keys move a column-wide cursor (seven characters) about the sheet, with the screen moving to keep the cursor in view. Entries refer to the cursor position. Eight single-key commands enable the user to jump to particular co-ordinates, recalculate formulae, save or print a whole sheet, replicate rows or columns, see how much memory is left, enter a formula and wipe the sheet clean.

Turner, who developed the program for his own use within Cronite, emphasises that SimpliCalc is not the machine code

## Portable market '\$5 million by 1991'

PORTABLE computers, and other related portable products, will play an increasing role in the computerisation of society, according to a report from International Resource Development. They will move beyond users who need the portability to carry out their jobs to those who simply want the ease, convenience and status of the devices, says the report.

The market for these units is expected to reach \$5,760 million by 1991, with a substantial consumer market growing out of the commercial, industrial and military markets.

More than a million units will have been shipped by then, compared with the current 55,000, the report predicts.

The eventual size of the business market is thought to be independent of the cost of the units. Those thought to be priced too low will be viewed with suspicion, particularly in terms of vendor support.

Consumers will be looking for more functions at entry-level prices, ratings ease of use highly.

The commercial success of portable computers will depend most on their user-friendliness, the report says, since most users will be non-technical salesmen or executives. "The computer will have to react to the user in much the same way that another human being would - it will have to make sense or it will be rejected."

The report predicts that voice recognition and synthesis will help with this, as will careful keyboard and display design.

User programming will have to be provided. A successful approach, according to the report, is to provide a simple natural-like language which can be used to describe control structures and system functionality. This might be inefficient from the systems point of view, but will perform tasks to the way the user wants.

Software costs are expected to reach three times those of hardware by 1985, largely because of the high cost of software labour and the shortage of programmers. The report predicts that software maintenance contracts will become common.

A software intensive portable product, \$1,285, International Resource Development Inc., 30 High Street, Norwalk, CT 06851, USA.

## COMPANY NEWS



LAIDLAW... Orders already running at a higher level than last year.

## Oriel bureau for sale

ORIEL Computer Services, the Oxfordshire-based bureau and service operation which went into receivership before Christmas, is now for sale as a going concern, complete with 30 staff.

The company, founded in 1968 by its current sales director, specialises in providing computer-based cataloguing services to libraries in the UK and on the Continent.

From its original base in Oxford the company grew to a turnover of £400,000 in 1979, with profits that year of £20,000. By 1981 Oriel had pushed turnover to £700,000 but profits fell to £5,000.

In 1981 the company moved to new offices in Clipping Norton, and according to Alan Adam of the Birmingham office of receivers Peat Marwick Mitchell, the move cost the company more than anticipated. Within a few months losses of £90,000 had been clocked up and by October the staff had been reduced by 14 to the current 30.

There was a last-minute bid to rescue the company when a local property millionaire, Sir Thomas Hosken Coswell, joined the board as chairman, but on December 18 the receivers were called in.

# ICL out of risk and heading for £50m profit, say brokers

A LEADING firm of City stockbrokers has predicted that ICL will turn in a profit this year, despite recent losses.

Michael Whittaker, the computer industry analyst at brokers Simon and Coates, says that ICL is a buy, and that the company is out of its period of greatest risk.

He also reckons that the company will make a pre-tax profit of £10 million this financial year, and will achieve pre-tax profits of £50 million in 1982/83.

Whittaker makes these predictions in the wake of the full annual accounts of ICL, issued last week.

These accounts show just how serious the company's position became in one year, with a pre-tax profit of £17.7 million turning into a loss of £55.2 million and revenue reserves in the balance sheet falling from £108 million to minus £11.8 million.

An extraordinary loss item of £78.1 million, which consisted almost exclusively of the cost of more than 9,000 redundancies, and factory closures, gave the company a final loss of £133.1 million. This was about £20 million more than the average guess by the financial community in the City, which had finally reckoned on a figure around £110 million.

The company's revenue reserves, which are the normal balance sheet buffer against the kind of losses sustained last year, took the heaviest pounding.

The total reserves at the end of September, 1980, stood at £108 million and by September 1981 the reserves had fallen to a minus of £11.8 million.

This was despite a dramatic reversal of the foreign currency position from a loss of £11.6 million in 1980, to a net gain of £14.1 million in 1980/81.

It is continuing to sell off surplus properties and a further rights issue must be on the boards.

Both those items should help to reduce the debt, which stood at £97.4 million in terms of overdrafts and £92.3 million in the form of long-term overdrafts and export credits.

There are also the £50 million of £1 redeemable preference shares issued to the banks in exchange for straight loans and which are redeemable on April 5, 1983.

This grand total of £239 million will be costing the company anything up to 16% or more, particularly the overdrafts, and it is fundamentally this interest charge which wiped out the modest trading profit in the second half of 1980/81, and which will continue to jeopardise the company's recovery.

One of the more positive achievements of the new management has been the drastic reduction in the company's inventories.

Sinck, most of it in the manufacturing area, was cut from £183 million to £139 million.

This has coincided with a substantial speeding up in the manufacturing cycle.

Reports in July stated that the company had at that stage taken 28 days out of the time it took to manufacture goods. That trend has continued.

On the sales side there was a substantial change in the pattern of the company's business.

Rentals and services constituted 50% of turnover in 1980/81 compared with 42% in 1979/80.

Income from services also rose sharply, from £300 million to £357 million.

Sales of equipment fell by £21 million and sales of equipment to leasing companies fell by £41 million, from £150 million in 1980, to £109 million in fiscal 1981.

The company pushed sales in America up 50%, from £10.2 million to £15 million. ICL is also understood to be making a profit on its American operation, having made losses in 1980.

Sales in Asia and Australia rose from £85 million to £81 million and volume in Africa also rose, though less dramatically, from £75 million, to £77 million.

The major falls in sales occurred in Europe, where sales fell from £120 million to £103 million.

Sales in the UK fell by over £12 million, from £404 million to £392 million.

Income from the two leasing companies which ICL owns with Barclays and the Midland Banks fell away very sharply, from £4.9 million in 1980, to £1.9 million in 1981.

No explanation is given for the sudden £3 million change in this revenue, but many companies switched in 1981 from leasing to rental of their computers and ICL benefited from this in rental revenues.

The company also increased its repurchase provisions with the leasing companies from £19 million in 1980 to £22 million in 1981.

Because the accounts are now three-and-a-half months old in terms of the information they contain, items like the sale of the PCB factory to Fujitsu are not mentioned. Sales such as this will have a significant impact on the company's cash position.

Brokers Heseltine Moss have recommended the ICL shares up to £1.

Other brokers say that the night issue is going well and that the underwriters would be happy to take up any surplus shares.

## Software development tool

A DUAL-DISC microcomputer development system based on CPM has been developed by Vector International of Leuven, Belgium as a software development tool for microsystems using 8080A and 8085 processors and for prototyping systems using Vector's 8085A-based microcomputer Eurocard set, the MMD family.

The unit, MMD-DDS/C, uses the Eurocards and is housed in a portable Eurocard frame. The basic unit has 32K dynamic RAM and two disc drives giving 160K user space. Six empty card slots allow for memory expansion and provide additional I/O options. An EPROM programmer can also be added.

Operating system software includes CPM 2.2, which Vector distributes in Europe, and utility programs.

## Zilog cuts power consumption

POWER consumption is down to one-tenth of that of a standard Z80 microprocessor is offered by Zilog with its low-power version, the Z80L. Clock rates of 1, 1.5 and 2.5 MHz are available with power consumption of 75 mW.

The reduction in power consumption has been achieved by adjusting the parameters of the production processes. Reducing the doping levels gives the lower power consumption, but with a lowering of the operating speed of the device. Shrinking the size of the device has enabled the speed to be kept up.

The Z80L is fully pin and software compatible with the standard part is fully supported by Z80 development systems and in-circuit emulators. It can be used with Zilog's 8-bit peripheral chips. Low-power versions of peripherals will be introduced, using ten per cent of the power of current chips at prices substantially lower than CMOS equivalents, according to Zilog.

The Z80L sells for about £10 for the 2.5 MHz version in quantities of 100.

## Switch on faster with the No1 DEC Terminals Distributor

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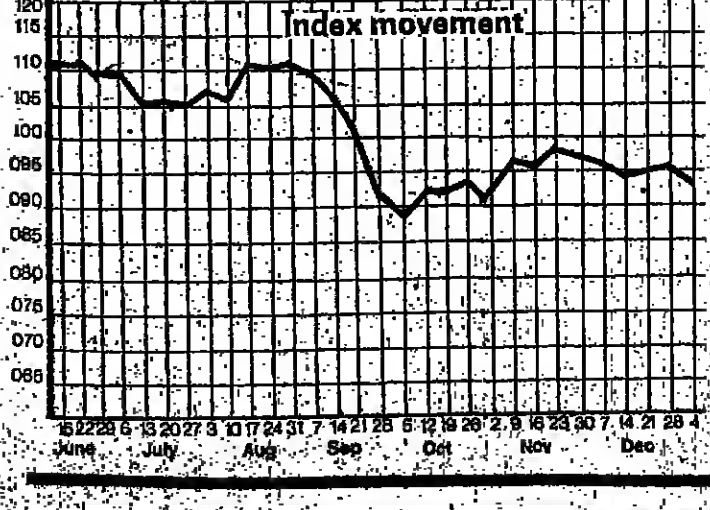
Rapid Recall for DEC Terminals

## CW SHARES TABLE

Price	London Stock Exchange	Price	Change	US Stock	Price	Change
1981		1981				
High	Low	High	Low	High	Low	High
183	180	183	180	183	180	183
180	178	178	175	178	175	178
178	175	175	172	175	172	175
175	172	172	169	172	169	172
172	169	169	166	169	166	169
169	166	166	163	166	163	166
166	163	163	160	163	160	163
163	160	160	157	160	157	160
160	157	157	154	157	154	157
157	154	154	151	154	151	154
154	151	151	148	151	148	151
151	148	148	145	148	145	148
148	145	145	142	145	142	145
145	142	142	139	142	139	142
142	139	139	136	139	136	139
139	136	136	133	136	133	136
136	133	133	130	133	130	133
133	130	130	127	130	127	130
130	127	127	124	127	124	127
127	124	124	121	124	121	124
124	121	121	118	121	118	121
121	118	118	115	118	115	118
118	115	115	112	115	112	115
115	112	112	109	112	109	112
112	109	109	106	109	106	109
109	106	106	103	106	103	106
106	103	103	100	103	100	103
103	100	100	97	100	97	100
100	97	97	94	97	94	97
97	94	94	91	94	91	94
94	91	91	88	91	88	91
91	88	88	85	88	85	88
88	85	85	82	85	82	85
85	82	82	79	82	79	82
82	79	79	76	79	76	79
79	76	76	73	76	73	76
76	73	73	70	73	70	73
73	70	70	67	70	67	70
70	67	67	64	67	64	67
67	64	64	61	64	61	64
64	61	61	58	61	58	61
61	58	58	55	58	55	58
58	55	55	52	55	52	55
55	52	52	49	52	49	52
52	49	49	46	49	46	49
49	46	46	43	46	43	46
46	43	43	40	43	40	43
43	40	40	37	40	37	40
40	37	37	34	37	34	37
37	34	34	31	34	31	34
34	31	31	28	31	28	31
31	28	28	25	28	25	28
28	25	25	22	25	22	25
25	22	22	19	22	19	22
22	19	19	16	19	16	19
19	16	16	13	16	13	16
16	13	13	10	13	10	13
13	10	10	7	10	7	10
10	7	7	4	7	4	7
7	4	4	1	4	1	4
4	1	1		1		1

The table shows the closing prices in London on Thursday and in America on Wednesday. The share index is based on the prices of the UK companies in the table. Highs and Lows have been adjusted where necessary.

\*Shares traded on the United States Market under Rule 144(2)(a).



## Quest shocks market with half-time loss

QUEST Automation, the Dorset-based computer-aided design and mini maker, has shocked the financial community by revealing a £1.4 million loss for the first half of the financial year.

Quest recently came to the Stock Exchange and the shares were quoted as high as 175p at one point.

The price was one of the highest achieved by a computer company and the sudden revelation of the loss, accompanied by the directors' prediction that the company would make a loss for the year, was unexpected.

Last year Quest also revealed a loss for the first half of the year of £347,000 but recovered from this to show a final profit of £813,000.

Tony Ebel, managing director, says the results have been materially affected by the world recession.

Quest is involved in very advanced computer software and hardware, and the research and development expenditure at the company has increased from £449,000 last year to £501,000 in the first half of 1981.

Late last year Quest launched a minicomputer, the Q1600, and sales of this machine have been particularly affected by the poor economic climate.

However, the company is involved in aggressive marketing expansion and this has contributed to overheads in the short term, according to the directors.

On top of that, Quest bought Genesys and Computer Instrumentation last year.

Computer Instrumentation has recently been reorganised. Ebel says the short-term effects of this will be felt in the second half, though the company is predicting a profit in this area.

For Genesys the directors are forecasting a negative return right through to February.

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## GILB'S MYTHODOLOGY

## Watch out for complexity, it is a danger signal

The Fifth Law of Reliability: Self-checking systems tend to be complex in proportion to the inherent lack of reliability of the system in which they are used.

WHEN a salesman gives you a long list of automatic features, in his product, for fighting errors: Beware!

You must not fall for the temptation to translate his message in the way that he wants you to: "My system is more reliable than my competitors", because it has more error-handling features.

Remember that there is another possible translation: "Our system has been so full of bugs, errors and problems in the past, that we have finally added error detection and correction features to compensate for our bad design. I am telling you this in case the bad rumours from our other customers have already reached your ears."

This is not to imply that the presence of error-fighting facilities is necessarily a bad sign. But it is not necessarily a good one either.

For example, the one or two check digits at the end of an identification number usually indicate that the designers have not seriously considered or understood the more powerful capabilities of natural identifiers such as name and address information.

My national identification number 241240-385-76 has two check digits: TOM GILB 1411 (same length as the number) using my name and postal zip code on birth date, would not only detect errors, but would also be able to correct them for several-character errors (by comparison against a suitable database).

The system would be inherently more reliable, since people are more likely to remember, and be able to verify, their names, than any artificial number.

I should state that the natural code example I have given has many more possible variations than I can discuss here to make a convincing case.

A second example is in hardware. While one large computer hardware supplier announced the transition to enough parity bits (12 per 32-bit word of data) to perform automatic correction of all one-bit parity errors, a competitor

makes use of these same bits to increase available disc storage by about 25%. You can use this storage for your own reliability logic.

A third manufacturer proudly boasts that his circuitry is so conservatively engineered that even with severe power dips and failures bits will not be lost. He has no parity bits. They would only complicate the circuitry and increase the probability that something will go wrong. He opens the record on system availability to you for inspection, and it is convincing.

Regarding the first supplier, I had an experience on its system where the warning circuit for the parity bits failed intermittently for over 12 weeks (on an ill company in Melbourne) before the company would admit that its machine was failing.

I would not want to draw a conclusion on the basis of these three options. Many other factors play a role. But the Fifth Law seemed confirmed by this practical test, where the supplier with all the parity bits had such great troubles in its initial installations with power fluctuations, that even its error correcting codes were of little use.

As a third example, a software system supplier might tell you about the hundreds of people who work on the testing of its software product, and of the 50,000 test cases it is subjected to after every maintenance change. But in one such real case, this only resulted in such painful unreliability that one of my clients had to have three

taken orders in Europe worth £134 million, including one from Poland for a 19045 worth about £1 million. . . . A lesser mass memory with a capacity of one million million bits online was built by Precision Instruments of California for the University of Illinois.

A SUPERCOMPUTER said to be faster and more powerful than the IBM 360/195, the Texas Instruments ASC, was due to make its public debut in Amsterdam. . . . The BCS made itself unpopular by increasing fees - members' rate increased from £9 to £13. . . . In the last few weeks ICL had

10 YEARS AGO

From Computer Weekly of January 13, 1972. . . .

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Tom Gilb is an independent consultant, lecturer and author on computing topics.

full-time employees just to fight the new bugs in the software.

The salvation came only when the software supplier made use belatedly of the inspection method (Pagan's) and managed to clean up the product so well that my client did not need any specialists to fight the errors.

So in this case the impressive statistics on testing workforce and methods only reflected a hopeless error situation. The really reliable quality seems to come primarily as a result of early design engineering for reliability, coupled with strong quality assurance throughout those early design stages and continuing with QA through production of the system.

My advice to its readers is: Field experience is the best reliable indicator of system reliability (do not trust impressive design specifications alone), and

Reliability should be inherent in a design, and simply, not complexity, is the safest indicator of reliable systems.

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## FOCUS

## Racing to keep pace with IT

SHOULD productivity awards be allocated to government departments, it is already clear that our industrial IT Year team would scoop many of the prizes, except possibly from the Cabinet Office.

The Prime Minister's announcement that 20 IT centres were to be established has been trumped by the Minister for Technology in his New Year's report that the first 30 centres have already been created, with a further 70 in the data pipeline.

Given the current rate of progress, there could soon be more IT Year centres than DP installations or High Street micro stores.

With each centre costing the taxpayer around £100,000 a year plus an initial equipment funding of £55,000, the computer industry has suddenly (ICL apart) become a net beneficiary of public funds.

To these impressive amounts must be added those of sponsors which, with the notable exception of IBM in Portsmouth, are in the main public authorities and educational bodies.

The centres are designed for local unemployed youth who will be given training in basic information technology and social skills.

But just who will be imparting their collective knowledge and social wisdom skills in information technology is not yet clear.

It is an area to which even dedicated DP professionals are having a hard time just keeping pace with progress. Information processing already embraces teletext, facsimile, message switching, electronic mail and local area communication networks.

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## ComputerWeekly

Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS  
Thursday, January 14, 1982

## Fragmentation of effort

ONCE again, British industry is being taken to task for not organising itself effectively against foreign competition. This time the target for a critical report from the National Economic Development Office is the field of real time software - a subject in which Britain is used to thinking of itself as something of a specialist.

The report finds not that talent is lacking, the history of real time innovations such as the Coral and RTL/2 proves that, but that the effort to develop real time software is dissipated in bespoke projects rather than going to build high-level tools for general use.

"The general picture is one of enormous fragmentation of effort," says NEDO. It all comes down to the Not Invented Here syndrome, or even Not Invented by Me. Better management methods and software tools, and co-operation, are pinpointed as the way to keep Britain competitive.

The call for greater standardisation is one that will be met with approval by everybody in the real time software business. . . . so long as the standard conforms to the tools they have developed. Individual companies have a way of clinging to the techniques and tools they already have.

The emergence of Ada, the real time language defined by the Department of Defense in the US, could be the opportunity to break the pattern.

The Defence Department is a big spender, able to dictate its own terms. In an effort to get a foot in its contract door, British companies are already badding together to work in consortia on Ada and the Ada Programming Support Environment, tools at the very level specified by the NEDO report. Note that Ada itself was Not Invented Here.

If the companies can show themselves willing to bend by producing software which meets international requirements, then real time software could be high on the list of British exports.

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## LETTERS

## Pioneers of the past

AS it is your intention to publish a review of current ICL software, you may be interested in a brief history from a user's point of view of equipment from companies which were merged to form that group.

In 1940/41, the Powers-Somos mechanical punched card tabulator, programmed with a fixed-wire connection box, gave direct subtraction on its adding units, avoiding the need to accumulate debits and credits in separate accumulators to reach a net balance total, as was then necessary with Hollerith-type equipment.

In the 1960s, Ferranti with ICL delivered card readers which could take 65 or 80 column cards, including those with interstage punching, into the Orion or Atlas computers, facilitating transfer of all existing punched card data files to the computer.

In 1964, I received an Orion computer with fully developed magnetic tapes sorting software, running several jobs simultaneously, and giving, via the punched tape monitor output, data

for a detailed cost distribution of work among users.

In April 1966, I visited an associated company in New York, and was taken by their supplier to see his latest developments: at his bureaux, users were clocking in and out mechanically, to obtain approximate cost of multi-usage.

The experience gained with the Orion was carried forward into a 1904 system, again with automatic transfer of data from one-inch to 1/2-inch magnetic tapes via a computer link, in 1971-72 parallel running. I handed over the installation in 1973, and it has since been developed into a multi-access system from company branches, using later software, and procedures, built up over a period of some forty years, with mechanical, electrical and software aids, which were world pioneers, in my view, in their day.

HAROLD W. G. GEARING  
Vice-chairman  
The Computer Journal Editorial Board

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## Safe MD aims for '£15m turnover'

AIMING to turn Safe Computing from a £4 million turnover company to a bigger operation with a £15 million turnover within 10 years, has led managing director Michael Portlock to tighten up and centralise the organisation.

The divisional structure of the company has now given way to a system where all line responsibilities are centralised within a six-man management team, reporting to the managing director. Sales, product development, marketing and financial control for Safe's software business are now directly accountable to Portlock.

## Designer promoted

THIS board of Vermont Research has elected Terry Wright as technical director, in recognition of his work in leading the team of 20 responsible for developing the company's recently announced 8000 Series of 8in cartridge disc drive computer memories.

Wright was an electronics metallurgist with PIRA (Printing In-



Philpott Williams Bundred Walker Edwards Gottlieb

■ Derek Philpott has become national sales manager for test and measurement products at Tektronix UK. He has been with the company for more than 20 years and has previously held positions in European and International marketing departments in Gurnsey and the US. Graham Williams, who joined Tektronix in 1980, is national sales manager for the company's computer graphics equipment and Mike Bundred, who joined the company from Hewlett-Packard in 1979, has been named Southern district sales manager for computer graphics equipment.

■ Richard Walker, who has spent the past two years selling commercial programs for United Computing, has been appointed sales manager at UCC's Business Division. Also joining the company is Gareth Edwards, who becomes sales executive for business systems in

the Midlands. He was formerly with Datasab selling turnkey business systems.

■ Peter Gottlieb has joined Prime's London West branch as sales executive. He joins the company after 10 years at Computer Technology. Sales executive in Prime's government district is Paul Groves, who joins from Burroughs Machines where he was a zone sales manager at the Slough office.

■ Peter Pole has been appointed sales executive for the East Midlands at ABS. He was previously with Hoskyns and Safe.

■ Rannle Murphy and Simon Pescoc have joined Positron as development engineers. Murphy takes responsibility for a continuing programme of enhancements to the Positron range and Pescoc is responsible for software design.

■ Alan Goodale has joined P&O Computer Services as head of the company's new recruitment division. He was formerly a director of a Midlands recruitment consultancy and has also worked as personnel manager for J. Lyons, Automotive Products and Tube Investments.

■ Mike Simpson and Jenny Robinson have joined Diktat. Simpson, formerly with IBM, Commercial Union Assurance and ICL, becomes branch manager at the company's Walton-on-Thames office. Robinson, who previously worked with Jaguar, NCR and Xerox systems, is special projects manager.

■ Kon Coulter has been appointed marketing director of Rediffusion Computers. He joined the company in 1977 as product manager and served most recently as general manager, marketing.

■ David Smith, who has been with London Transport since 1966, has been appointed computer systems development manager for the organisation.

■ Charles Scott has been with Ferranti since 1979, when he joined as deputy controller of finance, becoming controller a year later. Before that, he was with clustered accountants Price, Waterhouse and Co.

The third new director is Ferranti veteran Alan Sheppard, who has been with the company for 22 years. He joined to initiate work on semiconductor devices, becoming chief engineer of the division concerned. He is now MD of Ferranti Electronics and chairman of the Ferranti California Group.

■ Ferranti names 3 directors

FERRANTI has named three new directors, appointed to the main board of the company. Robb Broadley, a non-executive director, is managing director of Baring Brothers which he joined in 1971. Between 1964 and 1971 he was a partner with London solicitors Allen & Overy.

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## Slow-moving Europe will be left far behind in network development

Computer Networks and Distributed Processing: Software, Techniques and Architecture. James Martin. Prentice-Hall, New Jersey, £25.50.

"WHEN a computer program says GET, it may be accessing a file unit attached to a computer a thousand miles away," points out James Martin early on in this well-informed, didactic presentation. But in the new technology of distributed processing, where intelligent machines in different locations co-operate by means of networks, how do you ensure compatibility of the distributed systems?

The book covers descriptions of many types of networks and distributed processing configurations, and explains the architectural concepts. Very thoroughly it goes on to portray the mechanisms used in networking before setting out

ways of dealing with errors or failure as well as ensuring privacy and security.

It is generously illustrated, and a valuable feature for aiding comprehension is the layout which picks out factors involved in appraisals, displaying them clearly in a "box". For example, to show why different architectures are needed for telephone users and users of computer networks, the respective characteristics are listed alongside each other in such a box as well as being discussed in the narrative text.

A similar approach is used to assess the advantages and disadvantages of layered architectures, and in many other cases.

And the author is bold enough to discuss the future of network architectures. How far ahead will "Moore's Law" (that the number of electronic components in an in-

tegrated circuit will double every year) continue to hold good? Economics are involved here, more than basic physics.

The section goes on to examine such factors as standards, virtual circuits, packetised voice using high capacity circuits (1.544 million bps) for transmitting telephone conversations, and integration of systems - copying machines doubling as facsimile transmitters, word processing machines doubling as computer terminals and the like.

And, alas, he closes on a note of contempt for slow-moving Europe, believing that US developments will greatly increase the productivity of their office workers, professionals and executives leaving us poor Europeans well behind.

Israel Berkovitch

## Full of sound advice

Computers and Word Processors: A Guide to the Electronic Office for Practising Lawyers. Keith R. James and Neil M. Maybury. Society for Computers and Law, September 1981. 27pp, £1.00.

IT is generally supposed that the legal profession is slow to change, is unwilling to adopt new ideas and is antipathetic to all forms of technology. The fact is that a substantial minority of lawyers has embraced the advantages of computer systems with marked enthusiasm. Some lawyers have introduced computers to their offices with commendable speed.

For that larger number who have yet to get to grips with computer technology, this slim booklet will be of great help. Written by two Council members of the Society for Computers and Law with long experience of the subject, it is full of sound advice.

Bryan Niblett

## Hands-on manual for Apple users

Applesoft Language. Brian D. Blackwood and George H. Blackwood. Howard W. Sams & Co, Inc. 254pp.

THIS is essentially a practical manual. One of the authors found himself in the situation of having to teach himself programming techniques and the other used his knowledge as a computer engineer to help him. Together they have written this book for anyone who has to learn to program an Apple II microcomputer without the advantage of asking questions of someone more experienced.

The authors assume that the student is a complete beginner and start with basic instruction, but their practical approach means that the book will be suitable only for those who have free access to a computer. Section 1 deals with the Applesoft language. The first chapter teaches how to load and save programs, starting with a vocabulary list to explain terminology and proceeding to give step by step instruction to the student, who learns each stage by keying in the program and seeing the results.

The manual will necessarily be of limited appeal, but could prove an ideal companion to a lone Applesoft student.

Rosemary Shephard  
Freelance journalist

## Beginners won't learn about Unix this way

Using the Unix System. Richard Gauthier. Reston Publishing Company Inc (Prentice-Hall), 1981. £14.20.

LITTLE introductory literature for new users of Unix exists which does not already assume an elementary knowledge of computing. A few sections of the Bell Labs Unix programmer's manual are explicitly aimed at tyros, but the completely uninitiated may feel more at home with an introductory textbook which brings together such material in a comprehensive fashion.

Unfortunately, Mr Gauthier's book has serious defects which preclude its consideration as a candidate for meeting the above requirement.

This book appears to have been too hastily produced. While the book was type set using Don Knuth's Tex system on Unix, it could have benefited from the application of other Unix tools, especially those for spelling correction.

At many places in the text, Gauthier's formatting has gone awry; and for the Unix users with some experience, it may be amusing to speculate what the author intended, but the uninitiated will simply find this confusing.

To use the Unix system effectively, some understanding of the Unix design philosophy is desirable, but in his text Gauthier confines himself to the simple enumeration of commands with illustrations of their usage. His choice of commands and grouping of

them in the text is haphazard to say the least. Gauthier does not even attempt to cover the programming of C; nor does he give any account of the excellent documentation aids available.

It is this lack of emphasis on the software tool philosophy of Unix and the software development tools available with it which is the book's major defect, as it is this view of an operating system as a programming support environment which makes Unix important.

Gauthier's final ninth chapter on system administration is the longest in the book (75 pages out of a total 297) and it contains some useful suggestions, but it seems out of place in what is primarily a book for beginners. A student user of Unix in SWURCC who found nothing he didn't know in the first 100 pages and resorted to skimming found this chapter usefully consolidated his understanding of filestore maintenance, but it is unlikely that readers requiring four pages on how to log in and use passwords will require details on "zapping" nodes!

To paraphrase Bob Dylan - Unix beginners, this isn't the book you wanted, it's not the book you need! My advice is to keep on reading the Unix programmer's manual; there's a lot of it, but there's a lot in it.

Cornelia Boldyreff  
South-West Universities  
Regional Computer Centre

## Graphics still fascinate

A Practical Introduction to Computer Graphics. Ian O. Angell. Macmillan Press Ltd. 146pp.

THE relationships between points, lines and planes in 3-dimensional geometry with appropriate matrix representation hold a fascination for the amateur and professional DP person alike. This interest can be observed by the crowded graphics stands at major computer exhibitions.

A Practical Introduction to Computer Graphics is a technical computer book which, for once, does not suggest that readers of all levels and interests will benefit. In fact, readership qualifications are clearly defined at the start: "It is assumed that the reader has an elementary knowledge of the Fortran IV programming language, and of cartesian co-ordinate geometry."

That certainly eliminates many potential readers, except of course among third-year degree course undergraduates at London University for whom the text is designed.

The authors admit to having had his life changed by the discovery of computer graphics. This enthusiasm is certainly evident in this well constructed and produced book, which is published as part of the Macmillan Computer Sciences Series. It is to be hoped that the algebraic algorithms do not contain misprints such as on page one where tackle is spelt tackel.

The production of computer graphics suggests the author is loaded with mystique and has gained a reputation for complexity. A close study of the book, however, does not remove this caution.

Alan Simpson

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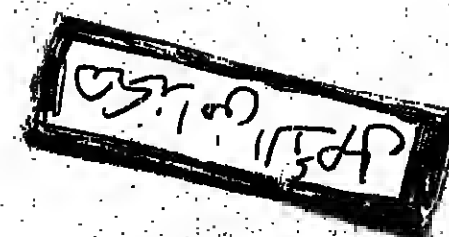
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# USER SURVEY 1981

Satisfaction assessed in Computer Weekly/Datapro unique user survey . . . Boris Sedacca reports on the findings

## Mainframe users give thumbs-down to ICL and NCR

ICL and NCR have received the thumbs-down from a third of their mainframe users, according to a major British survey of users' satisfaction.

IBM scored relatively highly in both mainframe and minicomputer categories, while Burroughs was at the bottom of the minicomputer ratings and scored badly among mainframes.

The satisfaction results are from the 1981 Computer Weekly/Datapro user survey carried out late last year among a total of 960 users throughout the country.

The survey is the second of its kind - one was carried out in 1980 - and unique in that it sets out to test user satisfaction with systems, not just to assess what they have installed.

It was carried out by Computer Weekly for the UK and based on a questionnaire designed by the US-based Datapro Corporation.

Similar user surveys were conducted in France, West Germany and in the US in co-operation with the leading computer publications in those countries.

One-third of ICL users polled in the survey would not recommend their systems to other users. This does not bode well for the company at a time when it is trying to restore confidence among its users.

ICL is the worst hit of all the manufacturers in this respect, with only 55% of its users saying they would recommend their system, while 12% remained undecided.

NCR also performs badly with 32% of users saying they would not recommend their systems, although 59% said they would, and 9% were undecided.

Eighty-six per cent of IBM's mainframe users who responded

recommended their systems while 9% did not and 5% were undecided. For minicomputer users, the respective figures were 82%, 8% and 10%.

The other manufacturer with a significant proportion of users who would not recommend systems was Burroughs (22%), although 70% reacted positively.

Last year's Computer Weekly commented on the low ratings which Burroughs appears to be consistently dogged with, and although the company has declared its intention to set matters right it seems to be failing an uphill task.

The question "Did the system do what you expected it to do?" showed most mainframe users' expectations as having been broadly fulfilled. NCR again fared badly relative to other manufacturers with 18% of its users replying "No", followed by ICL with 13%.

Univac had the least number of users who replied "Yes" (76%), with 8% saying "No" and 16% undecided.

Hewlett-Packard scored the highest in the minicomputer category with 91% of users recommending their systems, followed by 85% for DEC, 81% for Prime, 77% for ICL and NCR, 70% for Data General and 69% for Honeywell.

Manufacturing industry is still the bread-and-butter of the majority of computer manufacturers, with the exception of ICL which has cornered a substantial part of the market for government contracts, the survey shows.

Twenty-five per cent of mainframe users who responded to the survey are in manufacturing industry, followed by banking and finance (9%), government (9%), ser-

vice bureaux (8.7%) and retail/wholesale (8%).

Manufacturing industry also forms the largest number of minicomputer users who responded, at 26%, followed by retail/wholesale (15%) and engineering/scientific (8%).

The most popular language for mainframe and minicomputer users is, not surprisingly, Cobol, while microcomputer users generally appear content enough to use Basic.

The number of participants in the survey as indicated in Table 1 underestimates the actual number of systems in use as some users run multiple installations.

### IBM

The IBM user sample is the largest in the survey for mainframes, of which 33% of respondents are in manufacturing industry, followed by 11% in the chemical/petroleum industry.

At the top-end, IBM's 3033 gets a rating of 2.67 out of a maximum 4.00, while the now-obsolete IBM 3031 has a higher rating of 3.00 for overall satisfaction. IBM's 4331 and 4341 medium sized mainframes get ratings of 2.90 and 2.97 out of 4.00 respectively.

The IBM System 38 gets a fair overall rating at 3.27 in the minicomputer category, as does the System 34 with a rating of 3.36, while the System 32 single-user system is somewhat less popular with a rating of 3.00 out of 4.00. On average, 86% of IBM users in this category who responded said they would recommend their system to others.

The proportion of IBM users who responded to the survey from manufacturing industry is slightly higher in the minicomputer category (40%) than in the mainframe category, followed by 14% in retail/wholesale.



Honeywell's Level 64 lags behind the Level 66 on overall user satisfaction.

who responded to the survey from manufacturing industry is slightly higher in the minicomputer category (40%) than in the mainframe category, followed by 14% in retail/wholesale.

Fifty-three per cent of IBM's users who responded are on Cobol, 24% on PL/I, 13% on Assembler and 6% on RPG.

### ICL

ICL's 2946 medium-sized mainframe is the main contributor to the company's low average rating from users who responded to the survey. Overall satisfaction has a mediocre rating of 2.00 out of 4.00 on this machine, with two-thirds of its users stating they would not recommend it to other users.

The 2956 fares slightly better with a rating of 2.90 for overall satisfaction, while the older ICL 2960 gets a rating of 2.50.

ICL mainframe users form the second largest sample in the survey, the largest proportion of

which are in government (21%), followed by 17% in manufacturing.

ICL small business users were somewhat more enthusiastic about their systems than their mainframe counterparts. Seventy-six per cent said they would recommend their systems to other users, with 10% saying "No" and 13% undecided. Eighty-six per cent said their systems did what they expected.

ICL users represent the largest sample in this category, of which 32% are in manufacturing industry

and 14% in retail/wholesale, followed by IBM with 40%.

### Burroughs

In terms of user support, Burroughs is still clearly at the bottom of the pile against other mainframe manufacturers despite recent moves by the company to improve its service.

Users have given Burroughs an average rating for all mainframes of 2.19, 2.08 and 1.93 out of 4.00

# USER SURVEY 1981

## IBM tops the ratings

for troubleshooting, education and documentation respectively. In the case of the B2800, ratings are even lower (see Table 3), while larger mainframes do little better.

In the minicomputer category, 60% of users said they would recommend their systems to other users, while 27% said they would not.

Over half of the Burroughs mainframe users (52%) who replied to the survey are split evenly between banking/finance and retail/wholesale with manufacturing users in third place at 19%. In the minicomputer category, half of the Burroughs sample is split equally between manufacturing and retail/wholesale.

### Plug-compatibles

National Advanced Systems scores highly with users on overall satisfaction with a rating of 3.50, followed by Amdahl with 3.33. NAS also scored high on ease of conversion with a user rating of 4.00, and a rating of 3.50 for ease of programming.

Amdahl leads the field in technical support, with users giving the company a "perfect" rating of 4.00 for troubleshooting, 3.00 for education and 3.00 for documentation, while NAS lags behind with ratings of 3.00, 2.00 and 2.00 respectively.

But the size of the user samples for both manufacturers should be taken in the context of these ratings - three for Amdahl and four for NAS.

### NCR

The largest proportion of NCR mainframe users who responded to the survey are in manufacturing industry (27%), while minicomputer users show a strong retail/wholesale bias (36%).

Users of large NCR mainframes gave the company a rating of 2.88 for overall satisfaction, followed by a rating of 2.80 for the smaller 8500, and 2.81 for the 8200.

However, NCR gets a high score on reliability of mainframe with a rating of 3.33 for mainframes. NCR minicomputers win a high rating of 3.19 for ease of operation.

The poorest rating is given on the NCR 8500 for education (1.90), although Univac's Series 90 equivalent does even worse with 1.86, and Burroughs is the lowest at 1.50.

### Honeywell

Honeywell mainframe users comprise the third largest sample and constitute the highest proportion of users in manufacturing industry, with retail/wholesale users making up second place at 12%.

Honeywell's Level 66 top-end mainframe achieves an overall satisfaction rating of 3.22, while the medium-sized Level 64 lags behind at 2.89. The smaller DPS4 gets a rating of 2.83 and the Level 6 minicomputer drops to 2.67.

The overall satisfaction ratings belie lower ratings on finer detail such as education for instance where the Level 66 achieves a rating of only 2.25, while the gap appears to narrow on the Level 64 with a rating of 2.44 for education.

Troubleshooting on the DPS4 is a mere 1.83, even lower than Burroughs' rating of 2.00.

### Univac

Univac users show a manufacturing industry bias at 24%, followed by 12% in each of the following market segments: retail/wholesale, services bureaux and transportation.

A rating of 2.57 was given for overall satisfaction to the large Univac 1100 series mainframes, while the medium-sized Series 90 got a rating of 2.71.

The Univac 1100 gets the lowest rating for troubleshooting in the large mainframe category (1.86) and the lowest rating for documentation in the medium-sized mainframe category (1.71).

### Control Data

Of the seven users of Control Data equipment who responded to the survey, five are in education while one each is in engineering/scientific applications and insurance.

Users give Control Data an overall satisfaction rating of 3.14. Four users recommended the system, while two did not and one was undecided.

Control Data achieves the second lowest ratings for troubleshooting after Univac (2.14).

### Digital Equipment (DEC)

DEC mainframe users, mostly in education, gave their systems an average rating of 3.57, the greatest overall satisfaction for all manufacturers, although only seven responded to the survey.

Eighty-five per cent of DEC minicomputer users recommended their systems. The users are spread relatively evenly among the various industry segments: 14% in engineering/scientific applications, 14% in retail/wholesale and 11% in manufacturing.

DEC minicomputer users gave the company a rating of 3.08 out of four for overall satisfaction, and 89% said the system did what they expected of it. The highest rating was given to reliability of mainframe (3.28), while troubleshooting got a low rating of 2.52, and education even lower at 2.39.

### Other mini manufacturers

Hewlett-Packard users show a manufacturing bias at 41%, with education and engineering/scientific each representing 12.3%. Hewlett-Packard had the highest proportion of minicomputer users who recommended their systems to other users (91%). Reliability of mainframe gets a high rating of 3.68, while troubleshooting gets low ratings of 2.21 and 2.00 for the HP3000 and HP1000 respectively. Education on the HP1000 is second lowest (1.75) only to Burroughs' B80/90 with an appallingly low rating of 1.20.

The manufacturing bias is less apparent with Data General users, 24% of which are in this segment, followed by 14% in retail/wholesale. Seventy per cent of Data General's users recommended their systems, and 83% said it did what they expected it to do. The highest rating (3.28) is given to ease of operation.

Prime has a strong showing in the education market, constituting 31% of its users, with 77% saying they would recommend their systems and 85% saying the systems did what they expected. Base of operation gets a high rating of 3.46. Eighty-eight per cent said they were happy with response times, a significant advantage in educational markets where ICL scores badly with only 46%.

Four out of 16 Systeime users who responded to the survey are in the engineering/scientific market. Systeime scored 2.00 for documentation, second lowest only to Burroughs with a rating of 1.20.

### Programming languages

Cobol is the primary language for the majority of mainframe users (68%), followed by IBM's PL/I language (8.9%) which is also offered by plug compatible manufacturers Amdahl and NAS.

The use of an assembly language comes third at 6%, its main proponent being Univac with 20% of its users on its assembly language. Fortran is the fourth major language, having been adopted by

86% of Control Data users and 57% of DEC users. Fifty three per cent of IBM's users are on Cobol, 24% on PL/I, 13% on assembler and 6% on RPG.

The proportion of minicomputer users on Cobol is substantially smaller at 32% than that of mainframe users, while RPG is 21% and Basic at 19% gain prominence with mini users.

Cobol is the major language for users of ICL (55%), Honeywell (92%), Hewlett-Packard (72%), and Burroughs (81%) minicomputers and small business systems.

The proportion of Data General users running Cobol is the same as those running Basic, that is 28% for both languages, while the main language for 47% of DEC users is Basic. Basic is also run by 94% of Systeime users and all CMC users in the sample.

Basic is the primary language for 74% of microcomputer users, followed by assembler (11%) and then Cobol, Fortran, Pascal at 3.7% each.

(Datapro will publish the complete results of the survey in a report, British User Ratings of Computer Systems. Copies of the report, at 50 Swiss francs each, may be ordered from Datapro Services S.A., CH-1164 Buchillon, Switzerland)



Manufacturing industry remains the bread-and-butter of the majority of computer manufacturers.

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Table 1 - Number of participants in the survey

Name of manufacturer	Sample size
<b>MAINFRAMES</b>	
Amdahl	3
Burroughs	27
Control Data	7
Honeywell	35
Digital Equipment	7
IBM	101
ICL	77
National Advanced Systems	4
NCR	22
Univac	25
Others	6
Total	314
<b>MINICOMPUTERS AND SMALL BUSINESS SYSTEMS</b>	
BCL	3
Burroughs	16
CAL	4
CMC	14
CTL	10
Honeywell	40
Data General	29
Datapoint	110
DEC	4
Diablo	4
Digico	4
Ferranti	4
GEC	4
Harris	4
Hewlett-Packard	112
IBM	123
ICL	123
Kienzle	3
NCR	3
Perkin-Elmer	22
Philips	3
Prime	8
Rai	24
Systeime	3
Texas Instruments	16
Univac	16
Wang	9
Others	5
Total	646

Table 2 - User Ratings, large mainframes

Manufacturer & Model	Overall satisfaction	Applications programs	Support a) Troubleshooting b) Education c) Documentation
Amdahl	3.33	3.00	a 4.00 b 3.00 c 3.00
Burroughs	2.75	2.38	a 2.13 b 2.13 c 2.13
Control Data	3.14	2.67	a 2.14 b 2.14 c 2.57
Honeywell Level 66	3.22	2.71	a 2.44 b 2.25 c 2.33
DEC	3.57	2.71	a 2.86 b 2.14 c 2.86
IBM 3031	3.00	2.50	a 2.50 b 2.50 c 2.50
IBM 3033	2.67	2.00	a 2.00 b 2.67 c 2.00
ICL 2960	2.50	1.75	a 2.17 b 2.50 c 2.08
NAS	3.50	3.00	a 3.00 b 2.00 c 2.00
NCR	2.88	2.50	a 2.40 b 2.80 c 2.83
Univac 1100	2.57	1.80	a 1.86 b 2.33 c 2.57

Table 3 - User Ratings, medium size mainframes

Manufacturer & Model	Overall satisfaction	Applications programs	Support a) Troubleshooting b) Education c) Documentation
Burroughs B2800	2.25	2.50	a 1.25 b 1.50 c 1.75
Honeywell Level 64	2.89	2.20	a 2.44 b 2.44 c 2.50
IBM 4331	2.90	2.48	a 2.23 b 2.39 c 2.48
IBM 4341	2.97	2.85	a 2.42 b 2.63 c 2.53
ICL 2956	2.98	2.50	a 2.30 b 2.60 c 2.60
ICL 2946	2.00	1.80	a 1.83 b 2.33 c 1.83
NCR 3500	2.80	2.71	a 2.00 b 1.90 c 2.70
Univac Series 90	2.71	1.50	a 2.00 b 1.86 c 1.71

Table 4 - User Ratings, large minis/small mainframes

Manufacturer & Model	Overall satisfaction	Applications programs	Support a) Troubleshooting b) Education c) Documentation
Burroughs	2.50	2.87	a 2.00 b 1.50 c 1.50
Honeywell DPS 4	2.83	1.67	a 1.83 b 2.33 c 2.00
Data General Eclipse	2.82	3.00	a 2.73 b 2.45 c 2.36
DEC PDF-11/90	3.12	2.39	a 2.32 b 2.25 c 2.39
DEC VAX II	3.13	2.67	a 2.86 b 3.25 c 3.00
Hewlett-Packard HP3000	3.14	2.78	a 2.31 b 2.57 c 2.71
IBM System 38	3.27	3.17	a 2.45 b 2.36 c 2.91
ICL MR29	2.68	2.50	a 2.37 b 2.67 c 2.58
NCR 8200	2.81	2.63	a 2.16 b 2.44 c 2.36
Prime 750	3.40	2.75	a 3.40 b 2.60 c 2.60

Table 5 - User Ratings, small business systems

Manufacturer & Model	Overall satisfaction	Applications programs	Support a) Troubleshooting b) Education c) Documentation
Burroughs B80/B90	2.00	2.20	a 1.60 b 1.20 c 1.20
CMC Realty	3.00	2.71	a 2.29 b 2.64 c 2.50
Honeywell Level 6	2.67	2.00	a 2.08 b 2.00 c 2.50
Data General Nova	2.75	2.67	a 2.67 b 2.67 c 3.25
DEC PDF-11/34	3.14	2.59	a 2.63 b 2.36 c 2.34
Hewlett-Packard	3.00	2.50	a 2.00 b 1.75 c 2.40
IBM System 34	3.36	2.93	a 2.74 b 2.91 c 3.08
IBM System 32	3.00	2.80	a 2.67 b 3.17 c 3.17
ICL System 10	3.00	2.54	a 2.55 b 2.69 c 2.38
Prime 550	3.00	2.14	a 2.00 b 2.25 c 2.22
Systeime 5000	2.75	2.00	a 2.25 b 2.13 c 2.00

Note: Some results are based on small sample sizes and should be treated with caution.



# SOFTWARE

MONTH

Claire Gooding edits this month's special feature on ICL's sometimes controversial operating systems

## ICL When loyalty becomes a problem

criticism for its marketing — or lack of it.

Like many characters who attract gossip, the company is full of contradictions.

It is noticeable that some of its fiercest critics (sometimes those whose livelihoods depend on ICL), still adhere faithfully to its machines and operating systems. The operating systems particularly are controversial: ICL's tangled OS strategy has kept the trade Press busy for some time.

The second edition of Software Month takes a long hard look at what ICL has to cope with on the systems front, and how things got that way.

Ironically, one of the problems that ICL has struggled with for some time is loyalty. Well-established users are so content with their familiar George 3, that they need a lot of persuasion to move to something larger and more up-to-date.

The sweeping changes made by the new managing director Robb Wilmut are bound to alter ICL's somewhat tired image. Notably, Wilmut announced that the company's future growth would be led by software.

Software revenues for ICL have jumped by 43%, a familiar pattern for the whole industry. And the

lesson seems to have been learnt. Christopher Laidlaw announced that "a networking product line" would be the heart of ICL's strategy from now on.

So hardware factories — a great sponge for capital — move further down the list of priorities, and software, something that ICL can make a great deal better than many hardware merchants, comes into its own at last.

In the past, the job of those who have chosen to write software for the ICL market outside the company itself has been made more difficult by ICL's attitude, which appears often to have been uncooperative.

Now ICL is promising to throw its doors open to those who want to know the technicalities, to be able to cater more efficiently for ICL users.

ICL's satellites report that there have been moves to fulfil the promises. Some have received forms on which they are invited to submit details of products to form a directory of ICL software.

If the ICL software vendors are a little suspicious, and asking what's in it for them rather than leaping to respond, they perhaps have good reason, given ICL's poor track record in the past on selling other people's goods.



But the bad experiences usually teach the most valuable lessons. ICL has certainly been through some character-damning trauma in the last year, and the result might be that it devotes its energy and resources to the things that, given a chance, it could do really well.

## Why operators fell in love with George 3

by Andrew Thomas  
THE first operating system worthy of the name was called GENRAL ORGANISATIONAL Environment 3. There had been supervisory software called operating systems for some time, but these were solely for running batch, interactive, or online work. George 3 provided all three modes simultaneously and was thus a truly general purpose system.

George 2 was in general use by the late 60s, but the inflexibility of its macro system and the simple and fragile spooling mechanisms made it a rather restrictive artefact. Operators still had to load packs of over 10,000 cards every time jobs such as payroll were run, and the restart facilities for jobs and listings were rudimentary. It

was better than manual execution, but only just.

And then there was George 3. Suddenly, all the peripherals, once the sole preserve of the operators, came under the control of an operating system for the first time. The machine, once an inanimate object capable of doing sums, took on a personality of its own.

Operators were addressed in English, rather than in code. "XSDC LDT WPR MT42" became "PLEASE LOAD WPR ON UNIT 42", and "OXSDC HALTED ZZ" became "PAYROLL BROUGHT FORWARD MAINFILE TAPE FAILED - RESTART AT RUN 5.9".

Operators had been freed from worrying about loading the wrong

tape or type of stationery, to become more involved in the interesting parts of the job.

It was at this point that many operators and users began what can be best described as a love affair with George. Their careers and the operating system developed in parallel. George made mistakes which destroyed the idea of it being an impersonal overlord, and when the users made mistakes, George error messages had the personal touch.

George frequently referred to himself as "I", and sometimes added a royal touch, as befits his full name, when reporting failure to find a label in a macro: "I CANNOT FIND LABEL 9END".

When George was an immature operating system, system crashes were quite frequent. Security dumps of filestore were taken at a maximum of two-hourly intervals. But so good were the diagnostics (called post mortems, another personal touch) that bugs could be corrected rapidly, usually by the on-site team responsible for the operating system. Calls to ICL's help-line were the exception rather than the rule.

Because George was so helpful to his keepers, reliability, performance and the range of facilities supported grew steadily. Probably the only change that failed to find universal approval among operators was that between marks six and seven.

Prior to mark seven, George would freeze the entire online filestore when performing the security dump. This meant that every two hours, all work in the machine room would come to a halt for the 15-20 minutes required to complete the operation.

Mark seven was "improved" to only freeze the directories once at a time, as and when they were actually being written to tape. Only work in the frozen directories stopped, the rest of the workload continuing as normal, effectively removing the two-hourly tea breaks.

While George was still falling over at regular intervals, ICL was thinking about the successor to the 1900 and System 4 ranges, and what operating system should run on it.



The Great George Love Affair: Contented George 3 users surrounded by envious hordes.

System 4, the old English Electric machine, had a reliable but unimaginative operating system known as J Level. Both of them bore an uncanny resemblance to the products of a major American manufacturer.

Those responsible for choosing the path along which to develop the new operating system had to make a decision — the stable J Level, or the promising but unreliable George 3. The coin was slipped and the die cast. System B duct. The fact that J Level used the industry standard 32 bit architecture, rather than the 24 bits of the 1900 series may well have contributed to the decision.

hourly intervals, were now done daily.

It was not unusual to see the numbers associated with jobs, which are incremented by one for each successive job, in five figures. George now only failed on extremely rare occasions, and the reliability of the hardware was the main concern.

Then came the launch of the 2900 series and the new operating system, now dubbed VME/B. With all the expertise built up with George 3, it couldn't fail to be faster, more reliable and easy to use from day one.

Or could it?

Users familiar with the informative plain English error messages of George were now confronted with messages such as ERROR 576886, which would then have to be looked up in a manual.

On the subject of manuals, B excels itself. There must be at least 50 of them, most of which are incomprehensible unless you already know what you are looking up. The Cobol volumes, for example, are the last place to go for help on a Cobol problem.

Practically any problem encountered with George 3 would be resolved by reference to two manuals: Operating Systems George 3/4, and George 3/4 Operations Management.

As to the easy-to-use claims of B, there are sites which say they have found B easy to use, but in the main these are first time users of operating systems, who have little or no conception of how easy

pleast tasks, such as logging in, must have greatly increased the consumption of coffee among users.

From the operations viewpoint, of what value is an operating system which cannot tell you which jobs are currently running, and gives no more detail than the job name on listings waiting to be printed?

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## 'Doomed to obscurity'

to use an operating system can and should be.

Sites where George has been in use for some time are more immune to the charms of B. It is difficult to unlearn what has become second nature and start again from scratch. There is always the George methodology at the back of your mind reminding you it was easier in the old days.

Customers who are "delighted" at the performance of B usually forget that they have replaced an old, overloaded machine with a new one of at least twice the effective power as a result of the 2900 range utilising instruction pipelining and slave stores.

One wonders how much more delighted they would have been if they had simply upgraded the hardware and retained the old faithful operating system. Even with a 2900 OCP microcoded to resemble a 1900 (with every fourth byte wasted), George will still perform in a most impressive manner.

It is an oversimplification to say that George supporters are too besotted with old faithful to give VME/B a fair chance.

The site where I last worked had two 2960s. One of 4.5 Mbytes running VME/B, and a 1.5 Mbyte one running DME/G3. The smaller machine processed considerably more work than its larger brother, George's MOP response times were always better than VME/B's MAC, and the response times of the modest TP system run under B often grew to the point where a political decision had to be made to take all batch and MAC work off in an attempt to improve the situation. Why do you need an operating system to run a single slot

machine?

The reason usually given was that the machine was either too small and/or guileless to do justice to B, but if an identical machine with a third of the mainstore can get through the work using George, why bother with B at all?

The stock reply to this question is "extra facilities".

There are surely many users who find that they do not actually need any extra facilities to do their work, so why are they there? A large number of the "extras" can be explained by the fact that a task performed by George using one command has been broken down into smaller chunks requiring the use of two, three, or more macros to execute.

A simple example to illustrate this point. You are already logged in and wish to set up a file containing the word "ashurbanipal".

First the George method:

IN FILE

ASHURBANIPAL

\*\*\*

VME/B (for the sake of completeness we will use the block structuring facilities):

SECTN

NP(ASCII)

PLP(ASCII, libraryname)

INP(ASCII)

ASHURBANIPAL

\*\*\*

SVP(libraryname, ASCII)

END

The third macro, PLACEFILE, is used to put the file into a library, which is strongly recommended, and the penultimate macro, SAVEFILE, could be expressed as SVP(\*) using the file currency.

It usually involves more effort to accomplish a task with B than George. For users with several years' experience of a complex operating system, it should surely be easy to adapt to a new one. It must be an oversimplification to say that George supporters are either too stupid, or besotted with old faithful, to give B a fair chance.

The only group of people who genuinely like VME/B are the systems programmers whose job it



In the early 70s George 3 freed operators for the first time from worrying about loading the wrong stationery or tape.

is to look after it. They have so much fun playing with it, that they fail to notice that it is not performing the prime task of any operating system, that is to help users run their work.

George 3 was written by a team of experts. VME/B suffered the "Mongol horde" approach — hundreds of coders wrote a few lines each. What is worse, because they were, in the main, anything but experts, they wrote it in a high-level language. Only now is B being completely re-written in an attempt to make it run faster.

George 3 running under the DME emulator on 2900 machines goes out-performed B that the emulator was sluggish to slow it down and thus make B appear to run faster.

The principal reason for people disliking VME/B is not its bulk, its still unimpressive performance on any but the largest 2900, or even the large number of very clever people it requires to keep it running. It is this: Why did ICL not learn from the early mistakes made with George and put B on the market as a mature, stable product?

It is a great pity that George 3 was not developed and marketed by IBM. Had this been the case, there would be no chance for another operating system to get a look in. George would be the industry standard, but is now doomed to fade into obscurity along with all the other ICL operating systems as IBM look-alikes swamp the market.

## A guide to ICL operating systems

EXECUTIVE 0, 1, 2 & 3

24 bit architecture  
The numeric suffix denotes suitability for use on 2900/34 range. Increasing numbers indicate more facilities and program slot capability. These can justifiably be called operating systems, having ICL and macro facilities, albeit rather limited.

EXECUTIVE 24 bit architecture

On the 1900 series enables multiprogramming. Controls peripheral transfers and store allocation. No job control, spooling or macro facilities. Sometimes known as MANUAL EXEC. User programs run under total operator control. Not really an operating system.

GEORGE 1 & 2

24 bit architecture  
1900 series simple operating systems. Split into input spooler, central module and output spooler, each of which runs as a "trusted" program under EXEC control. Programs can be run under operator control simultaneously. Limited macro and ICL facilities, and no filestore.

GEORGE 3 & 4

24 bit architecture  
Controls the resources of the entire machine. A cut-down EXEC provides autonomous peripheral handling. George controls the user programs, known as object programs. Operating system tasks are split into Chapters, dedicated to simple tasks and held on fast backing store, brought into mainstore as and when required to service an activity. Code is pure, obviating the need to rewrite after use. To the user, George 3 & 4 appear almost identical. G4 running on paged 1900s, G3 on any

1980 with more than 64K of mainstore although for useful work, 128K is a more sensible minimum. Powerful, easy-to-use ICL Self-maintaining multi-level hierarchical filestore with automatic archiving and restore. Reliable and offers excellent performance on large 1900s and microcoded 2900s under DME/G3 or CME/G3. Many "go-faster" bolt-ons available from ICL and independent suppliers make this an operating system with a secure future, and many satisfied users see no urgency in converting to

must look to the top end of the range. Filestore structure is particularly well thought out, and security is excellent. If you can afford to get a good team of technicians to build and maintain it, B will meet all your needs to the end of the century. If not, tread carefully, you may be better off with a cut-down version.

VME/K

Small scale 2900 native mode operating system, now deceased. Less ambitious design than VME/B, came to fruition earlier.

TMB

Operating system for the ME29. This machine, being a replacement for the 2903/4 range, runs with a 24 bit store width although the architecture is 32 bit. TMB itself could well be dubbed "Son of George 3". Simplified filestore and rather limited ICL facilities, some of which still do not appear to have been written. Again, rather slower than it might be although this is more a result of the hardware than the operating system. Great operating system for the first time user.

DME

This is not an operating system. It is an emulator enabling 1900 mode programs and operating systems to run on the 2900 range. Every fourth byte is chopped, effectively reducing the store width to 24 bits. DME and George 3 together performed too well for their own good. Even with the increased instruction path length and loss of 25% of the mainstore, they still showed VME/B and VME/K a clean pair of heels. Users could see few benefits, and many problems, in converting to native mode. ICL withdrew DME. The replacement, CME, allows both George and VME to run concurrently, sharing data and resources. Conversion is thus made more inevitable, if not much easier.

JLEVEL

Operating system for the larger System 4 machines (4-40, 4-50, 4-70). Batch oriented, communication control package an optional bolt-on for the supervisor. Facilities similar to those of George 2, but overall a more sophisticated system. Could well be dubbed "Father of VME/B".

## What does it all mean?

DME  
CME  
TMB  
VME  
GEORGE  
IPA  
IDMS

Direct Machine Environment  
Concurrent Machine Environment  
Transaction Machine Environment  
Virtual Machine Environment  
General ORGANISATIONAL Environment  
Information Processing Architecture  
Integrated Database Management System

native mode 2900 working. Weak handling — but good for small to medium networks.

VME/B

32 bit architecture  
2900 native mode operating system, early versions of which were plagued with reliability and performance problems. There is still plenty of room for improvement in both areas. Vast array of facilities, a number of which most users will never require, contributes to a large operating system overhead which can leave smaller 2900s gasping for breath. Not really suitable for anything smaller than a 2966 — if you really want to use all the latent power of B, you

Still has many advocates and devotees.

VME/B-E

Entry level version of VME/B. Easy to set up and maintain with reduced facilities. Also deceased. VME/B and VME/B-E are now merged with VME/B to form VME/2900, although ICL is less than forthcoming with technical details.

VME 2900

The only native mode operating system currently supplied for 2900 series. More of a marketing exercise than an operating system. VME/B by any other name

## Fast Indexed Sequential ICL File Loader

by CHC Software

You can now load I.S. files fast — at least three times as fast as XPJZ generated programs!

Program ZUFO (Ultimate File Organizer) is designed to load I.S. files from serial disc/tape or I.S. disc. You can instruct ZUFO to leave 'gaps' in the file between selected keys so that heavy group insertions do not force an early reorganisation. The parameters are very simple.

You can also give ZUFO the first and last keys that you require in a file and let ZUFO divide the file space evenly so that the end result is a fully set up I.S. file, all indexes are established but the file contains no data. This is very useful when only insertions are made and the file is initially empty.

ZUFO is a free standing program. There is no awkward 'generation' to perform — ZUFO is 'ready to go'.

Timings show that ZUFO takes less than one third of the time needed by XPJZ generated programs, even if they use multi-bucket transfers and double buffers.

The outright purchase price of ZUFO is £475 (plus VAT in UK). This includes support and maintenance for as long as you use ZUFO. There are no so called 'recurring licence fees' or maintenance charges — ever!

This price is the outright purchase price per site, multi-site discounts are available.

If you would like to try ZUFO then it is available for a free, no obligation trial of 30 days. If you return it within 30 days then the trial is cancelled and you will remain free of obligation. If you do not return it within 30 days (plus an allowance for delays in the post) then we will invoice your Company for £475 (plus VAT in the UK) and our payment terms are 30 days net.

ZUFO is for ICL 2903/4, 1900, 2900DME and ME29.

To CHARLES COULTAS  
CHC Software Marketing Limited  
59 Warborough Avenue,  
Reading RG3 5LD

Telephone: 0734-669561  
Telex: 648986 CHCLTO G

Please send program ZUFO (plus documentation for our 30 day trial period). We will use ZUFO and try all the facilities free of obligation. If we retain ZUFO beyond the 30 days then you may invoice us for £475 (plus VAT in UK) which is the purchase price including full support and maintenance. There is nothing else to pay. If we decide not to purchase ZUFO then we will return it within the 30 days and there the matter will end. You will not then owe us and we will remain free of any obligation.

Name: \_\_\_\_\_ Media: Cards ☐ PT ☐  
Title: \_\_\_\_\_ Floppy ☐  
Company: \_\_\_\_\_ Track MT ☐  
Address: \_\_\_\_\_ (Please tick one box)  
Postcode: \_\_\_\_\_

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# SOFTWARE MONTH

## ROUND UP

Recent software events you may have missed:

■ Disc and tape manufacturer Memorex took another leap into software production and supply with the announcement of some utility products. The company broke off its agreement with Pittsburgh systems house Doquesne in favour of its own products which include remote printing tool MRXPRINT, the fast dump-restore MRXDASD, and an add-on for the Westinghouse Fast Dump Restore package called MRXFAST.

■ The BBC ran a successful experiment on the popular science programme Tomorrow's World, in which a Basic program was transmitted to viewers who received and ran the program - a simple print routine - on Apple II and Sinclair ZX81 machines. The experiment paves the way for wide-scale tele-software publishing as a method of distribution to microcomputer users.

■ One of the most widely used pieces of financial modelling software, FCS, made its appearance in a portable form which allows the same software to run on a main-

frame or microframe. Supplied by RPS Consultants, it is planned to appear on the Unix and CPM micro operating systems during the first part of this year.

■ A report from Strategic Inc. predicted that revenues from database and DBMS-related products would grow 16-fold in this decade. The report also pointed out that the traditional market share enjoyed by giants like Cullinane, Cullinane and IBM would probably be reduced because of the lack of relational tools in their ranges.

■ British software vendors were warned of the threat presented by Japanese software by David Fairbairn, director of the National Computing Centre. He was speaking at Software Information International, an event which gave European and US software vendors a chance to exhibit their products.

■ The software spin-off of British Leyland, BL Systems, launched the system which was behind the automated construction of the Mini Metro and the Triumph Acclaim. Called Pania, it deals with every aspect of the automated factory.

■ Dayco of systems houses ADR made a cautious move towards distributed database with the announcement of its Datanet DNet product. ADR is also trying to provide a future growth path for users who are already committed to a variety of products.

■ A tool developed by the University of Stockholm for the prototyping of systems was launched by design specialist Savant Enterprises. The tool, CS4, is billed as a software equivalent of the techniques used in contents addressing file storage.

■ Major British software house, CAP, turned in a loss of £1,274,000. The figure was attributed to the write-off of monies used to develop MicroCobol, now licensed off to Microproducts as a separate group, and a series of write-offs on former mainframe products. The company is being refinanced by British Technology Group and Chertseyhouse with £2.1 million.

■ Meanwhile CAP's one-time rival Logica reported profits which rose over 300% on the previous year at £1.7 million.

## SOFTSELL

### How to identify the real relational database systems

OVER the last year, manufacturers of database management systems (DBMS) have eagerly been announcing "relational" products. However, most of these have very little that is relational about them: this article sets out to describe what real relational systems are and why they are important.

With the development of software technology, the notion of a DBMS appears to be slowly expanding to include more capabilities. Today, the buyer will buy two things:

● A mechanism for the storage, retrieval and manipulation of data. This may be rather rudimentary, such as simple indexed files, or may offer further facilities such as the ability to change data

structures with minimal impact on programs (data independence), or the ability to associate one type of data with another (data reliability). ISAM and VSAM products are at the simpler end of the spectrum, as opposed to full-blown DBMS such as Total, IMS, D1/1, IDMS, MIDS and Adabas at the other.

● A series of software development utilities designed to make program implementation easier. These include VDU "fill-in-the-blanks" screen definition, data entry and query systems, report writers, and data dictionaries.

Simply put, a relational DBMS is one in which the data is represented as a series of separate two-dimensional tables, more or less corresponding to unitary tables. The data can be manipulated in various ways, and in particular, data from a number of different tables can be made to appear as if it comes from one single table. This capability is known as a join, and any DBMS not supporting one should not be called relational.

E. F. Codd first defined relational database systems in a 1970 paper, and purists will say that to be relational, the DBMS must satisfy the criteria Codd laid down. This, however, seems too strong.

Codd's work provides a particular type of data handling mechanism, one that is simple and has especially high degrees of data independence and reliability. Data models coming close to Codd's definition, and enjoying its benefits, deserve to be called relational. What makes a database relation-

al is that data is presented abstractly, with much more data independence, and less data redundancy than in other DBMS architectures such as the network, hierarchical, or inverted approaches. The join is the key in these additional capabilities.

A relational join is a powerful way of relating different types of data. It provides the ability to make a number of different tables appear to be a single table, without actually creating a new table. In other words, the join may be used to create virtual tables from a number of actual tables.

This means that the task of manipulating data - whether for example in a Cobol program or by means of some high-level query language - is much simpler. The user only thinks about one table, although in fact the data may be being drawn from a number of tables.

It also means that redundant data does not proliferate and that it is possible to alter the underlying database structure radically, with minimal impact on the existing body of programs using the data.

The benefits of the first point are obvious. DB managers familiar with the headaches of managing a portfolio of integrated programs will recognize the critical importance of the latter type.

To illustrate the degree of data independence that can be achieved with a relational system, consider what would happen if a supplier changed price policy to allow salesmen to negotiate a price, based on a customer's order.



Ferris is a consultant in the UK, providing marketing and planning advice to computer users, particularly in the area of software.

then he changed so that the table contains the decided price, the unit price in the product file is now the suggested price. We must database systems, this will mean that most of the software built using the customer order information would have to be changed.

With a relational DBMS this is not so, because the database administrator can simply redefine the customer inquiry view so that it takes the price from the order file instead of the product table.

In short, it is possible to change the underlying database structure in a major way, and by using its join function redefine data view so that there is minimal impact on the investment in software.

A lot of interest has been generated in relational systems because of their power, and a few vendors are offering such products. However, for various reasons, a number of them are offering products which really do not have much of a relational flavour to them. I suspect the reasons for this fall into two camps.

Firstly, many of them seem to think that by offering full support, together with an elementary cross-indexing scheme, they are providing something equivalent to a join. This is patently false: such facilities do not have anything like the data independence capabilities of a relational join, nor do they result in equivalent simplicity of use.

Secondly, they have a desire to capitalise on the current interest in marketing goods, but it introduces confusion for the average buyer.

It should be emphasised that many of these would-be relational systems are excellent, despite the fact that they are not really relational. They often have utility programs which speed up software development and maintenance procedures. Examples of such relational pretenders can be found in widely differing environments: ADR with Datanet in the mainframe world, Hecox with Logo for minis, and Ashton-Tate with dBase-III for micros.

The facts are that it is difficult to produce a real relational system, partly for performance reasons, and partly because the algorithms involved tend to be complex. There are consequently few commercially available systems that are decent candidates for the throne.

Some are IBM's pending software product SQL/DS, Relational Software's Oracle, Relational Technology's Ingres, and - in the future, if all goes according to plan - Computer Resources' Relate/3000.

More should appear in time, because relational DBMS has a lot to offer, and because supporting hardware (such as context addressable storage) will become more common.

For the moment, however, when your local DBMS salesman glibly tells you about his relational system, be a bit suspicious and ask him about virtual joins. Chances are, they will shut him up.

David Ferris

## What ICL's mainframe customers can expect over the next decade

AT the time that ICL announced its plans to axe the troubled VME/K operating system, managing director Robb Wilmut explained the need to slim down systems software by pointing out that the company supported no less than 30 operating systems.

Of course ICL is not alone among mainframe manufacturers in having to devote a great deal of resources to maintaining operating systems that it would rather do away with. Users are bound to want to protect their applications software investment for as long as possible.

So what can those users, forming a large group of ICL mainframe customers, who continue to run what is known in the trade as blue on orange (1900 operating systems on 2900 machines running under the Distributed Machine Environment) expect over the next decade?

ICL's director of commercial services, Peter Simpson, assured users in November that DME would not be axed. He pointed out that an absence of further development on older regimes did not amount to axing operating systems.

"On the contrary," he declared, "ICL has, uniquely among computer companies, introduced CME (Concurrent Machine Environment) as the concurrent environment. George 3 and DME 3 will continue to be supported via CME on current and future products."

"System 4 (J and Multijob) will have continued support on 2966 via CME but we think it unlikely that these regimes, whose users are an ever-diminishing number, will persist beyond the 2966."

"Our strategy is to sell to DME users the benefits of starting all new developments on VME 2900, and, at the same time, provide CME capabilities to run old work on current mainframes and on the next range of 1984 timeframe products, and we have commitments to support CME capability beyond 1990."

Getting from DME to VME may pose a problem for 2960 users though. "The CME is only available on 2966, but there is a big

base of 2960s in the field. The problem I have with my 2960 is how to get from DME to VME," said David Kelson, Computer Users Association chairman and head of Dupont Computer Services. "It is something that ICL has got to face."

ICL is doing its best at the moment to push VME 2900, which is not significantly different from VME/B. The two operating systems can be run side-by-side, with either the B or 2900 version on top. The company has also produced three systems products to go with VME 2900 - Reportmaster, Querymaster and Personal Data System (PDS).

Reportmaster is designed for report production and the access of files held on IDMS databases and other files. Querymaster is a command language designed for the naive user, while the PDS product is a self-contained information handling system for the manipulation of local data by untrained users. A TME version of PDS is already available to ME29 users.

All three of these products are tied to ICL's Data Dictionary System, which is designed to interface with IDMS, the Cullinane-designed database management system that ICL sells. The company has promised more software products operating under VME 2900.

There is bound to be some reluctance to move onto VME systems, although there is agreement that the system is settling, with the carrot of new packages, ICL will begin to move users up and on towards the big machines promised for 1984.

ICL has also been putting great emphasis on the networked product approach.

The Network Processor System, deliveries are due to start in April this year, can be used to share data traffic between up to four local mainframes. Data from up to 256 communications lines can be routed to the appropriate subsystem.

Although ICL was behind with a network architecture and has yet to demonstrate a user employing full IPA (Information Processing

Architecture) facilities, the company has pulled off a considerable coup in linking System 10s to an IBM 370 at Prudential Insurance by emulating IBM's transport protocol.

IPA is intended to emulate IBM's Systems Network Architecture (SNA), and conform to the International Standards Organisation's open networking standards.

IPA does offer a number of facilities, which can be "switched on" using the "golden pliers" technique (that is after they have been installed), but it is best looked at as a set of standard protocols that are gradually emerging as new ICL products are released.

"IPA is being released in phases. We are now up to 2.2," said Gordon Peake, manager of IPA. "It will give cheaper access to more systems and make it easier to introduce new software into an existing set up."



Peake also said that the effort of producing IPA concentrated ICL's mind on the structure of software packages.

Apart from systems so far announced, the company also has plans to acquire a wordprocessor and communications equipment capable of protocol conversion, advanced multiplexing and network control.

The Application Systems Development Division will, over the coming years, have to produce software for no less than five small machines and probably more.

At the sharp end, customer engineers could also come under similar pressure - ICL has not invested in the type of remote diagnostic systems, or phone-in maintenance centres that the likes of IBM, Digital Equipment and Univac have.

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The only IMS products that give you total control.

IBM's Information Management System lets you process great volumes of work, yet its complexity makes it very difficult to control. CONTROL/IMS provides performance evaluation, planning, forecasting, and financial management based on actual transaction values, instead of averaged values. And you get vast improvements on the quality of information. Our easy to understand CONTROL/IMS cost accounting routines help you to identify excessive IMS users as well as providing accurate user charge-backs at the transaction level.

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CONTROL/IMS and CONTROL/IMS REALTIME are the management software tools that give the big picture of your IMS system. Plus, they give you more detailed information than you ever thought possible, including advanced fault-finding techniques, all without changing a single line of IBM's code. With CONTROL/IMS and CONTROL/IMS REALTIME products, you'll finally be able to make your data centre run as smoothly and as in control as you'd like.

Pinpoint IMS problems online.

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## Where the company's software is produced

Bracknell, Berks: The main software centre in the UK and home of the distributed systems development division run by Chris French. Activities include the validation and release of VME operating systems; the development of "superstructure products" like IDMS and TPMS; the production of upgrades for common routines and facilities such as sort, merge and print; the development of range-standard compilers (ICL is currently working on compilers that will run under any operating system); control systems for the DRS 20 and System 25; work on the ME29 operating system - TME; development of IPA links for small systems plus work on Perg, CAPS and DAP.

Dalkeith: This site is also part of the distributed systems development division and is particularly concerned with work on terminal software, especially for point-of-sale systems and System 25. Software for testing Perg hardware which is due to be manufactured by ICL is also being developed here, as well as additions to the version of the DME operating system written for System 4 machines.

Kidsgrove: The main site for the development of VME 2900 (the operating system that replaces or

absorbs both VME/B and the now defunct VME/K). Kidsgrove is also the main site for VME work on communications controllers, and comes under the ambit of the mainframe systems development division.

West Gorton: Although primarily a hardware site, West Gorton is also concerned with the production of firmware and microcode for the 2900 range.

Leitchworth Development Centre: Traditionally this site has concentrated on what are known as special products. Work on microprogramming and terminal executives is currently being undertaken at Leitchworth.

Reading, Berks: Reading is the home of Dataslink, which has now been grafted back onto the main ICL operation. Restructured the Applications Systems and Services Division and manned by half the remaining staff of Dataslink, the new operation is charged with reorganising ICL's range of application software, writing new packages and liaising with third party organisations.

Slough, Berks: Here the much emphasised ICL network approach is being hatched. Development work on local area networks and IPA is being carried on at the Slough site.

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## SOFTWARE MONTH



# ICL 'more willing' to work with third party suppliers

THERE are between 400 and 500 companies selling products and services to ICL users. They range from one-man programming outfits to bureaux with international operations.

Early on in ICL's process of reorganisation, company directors made it clear that they planned to use these pilot fish as a means to boost hardware sales, particularly in the new small machine markets that the company had set its sights on.

"We intend very quickly to set up wide-spread arrangements to extend the method of marketing our systems, by increasing the number of channels through which we will supply them," said Ninian Badie, director of the product marketing division, in a briefing on the eve of the Sibco exhibition in Paris last September.

"First we include systems houses who will take ICL

hardware, software and services and then market them directly to end-users. These systems houses may, if they wish, add their own software, or software developed by other independent organisations. They may wish to provide additional hardware or supply their own maintenance and support services."

He added: "Secondly, we include software houses. Their role is to provide application-based business solutions for customers, to be operated on ICL hardware and using ICL supporting services."

"Thirdly we include service bureaux and especially network service bureaux who are taking the opportunity to develop existing customer systems to fit them for the networking world of the future."

How far has ICL moved towards this new deal and what is the re-

action from third party suppliers? Shortly after the Paris pronouncement, ICL announced a new organisation called 'Trader Point' - essentially a replacement for earlier efforts at system house co-operation, based on the systems house trading scheme.

ICL declared that it expected Trader Point to account for 25% of all small system sales by the end of its first year of operation and to have established an international network of trade sales outlets.

The hardware that ICL has earmarked for the scheme includes the Perq scientific and engineering graphics workstation, the DRS range of multi-user systems and the System 25 mini.

At the moment, ICL will not comment officially on exactly how many outsiders have struck Trader Point deals, although CAP, Logica and AIM are said to be close to coming to some agreement. The Computer Services Association, under the guidance of Jim Feeney, managing director of the Hoskyns Group, has been a prime target for ICL.

Although Feeney said there had been no "mass sign-ins" by CSA members, he talked of a "very high level of interest" created by a number of changes in the way that ICL viewed third party suppliers.

"The difference is fundamental, underlined by the disappearance of Datasil as a direct competitor to us," he said. "ICL is far more willing to work with the service industry than in the past."

There is, however, one stumbling block that has still to be overcome, the question of competition between ICL salespeople and systems houses who have bought ICL kit on an OEM basis.

"We are hopeful that ICL will solve this," said CSA director general Doug Eyleson. "There has to be an agreement on who sells where and to whom. It could be done on a product, industry or geographical basis, but there has to be an agreement."

At present there is certainly no public commitment by ICL to prevent its salesforce from selling in competition with systems and software houses, or to remove restrictions on OEMs that prevent them from selling upgrades to existing ICL customers.

"It makes life difficult," said David Ball of GDB Computer Services, which specialises in bolt-on systems software for ICL mainframes.

Ball was also critical of presentations made to systems houses interested in the Trader Point scheme. He claimed that ICL was unable to tell potential OEMs what their margins would be, could give no case histories that might be used to sell the system, or, alternatively, since it was a machine new to this country, give examples of how the system might be used.

Although a few third party suppliers were as openly critical as Ball, most adopted a wait-and-see attitude.

"The company has got to make up its mind whether it wants to license outsiders to sell products, or to compete with them," said John Gandy, founder of Gandy Computer Services.

One notable collaborative scheme ICL has got under way since the Autumn is with the Science and Engineering Research Council, the organisation charged with funding and organising university research, as well as providing computer facilities for universities and government research establishments.

A joint ICL/SERC software development team has been set up based at the Rutherford Laboratory, which is part of a network of government laboratories. The team is based in Rutherford.

Initially, the team is working on the implementation of the Unix operating system on the Perq scientific and engineering workstation, scheduled for completion at the beginning of this year.

It will allow the use on Perq of existing Fortran, Basic and Lisp compilers and utilities and applications software already running under Unix on other manufacturer machines.

Other Perq software development teams have been set up within ICL and at Three Rivers Corp, the US company that designed Perq and sold it to ICL.

The SERC connection could well prove a lucrative one for ICL. If the machine and software developed for it is adopted as a standard issue for this country's research establishments, then the company could shift thousands of boxes over the next few years.

However, other outlets may prove more difficult to establish. David Ball is to be believed. It maintains that it £25,000 the Perq is too expensive for systems houses.

ICL's VME teleprocessing monitor is generally reckoned to provide tough competition for third party suppliers.

This negative view was backed up by one of the more flamboyant operators in the ICL systems software field - Bernard Panton, boss of Oxford-based Telecomputing. "I don't think Robb Wilnot will get many software houses writing packages for him," said Panton. "We have been approached about a catalogue of applications software that ICL is building, but apart from that we have not been involved with the company in any discussions."

ICL's VME teleprocessing monitor - TPMS - is generally reckoned to provide tough competition for the third party supplier.

Nonetheless, teleprocessing remains a weak point in ICL's system software. In basic terms, the problem is that the routines which govern the interaction between a terminal and a host, including security and recovery procedures, were not completely separated from the application software.

This means that teleprocessing software has to be added to each individual application program.

Mick Punter, whose company Zeus-Hermes sells the Cortez monitor, maintains that outside suppliers still offer the best solutions to the teleprocessing problem. "Take TME TP on the M82, it is nowhere near what you can get from outside suppliers," he said.

Maintaining and "tweaking" George operating systems - mainly George 2 and George 3 - is another long established activity of third party suppliers. The Gandy group of companies, which includes Gandy Computer Services and George 3 Programming has been at it since 1971.

Another problem that Gandy will have to come to terms with, according to Gandy, is changes taking place in the structure of ICL operating systems. Gandy maintains that it is becoming progressively difficult to bolt extra software onto operating systems, because interface facilities are being hidden away from the user.

Despite these clouds on the horizon, Gandy companies seem to be getting on well with ICL.

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As a result of our progressive expansion and the recent opening of our central Reading office, we can now offer outstanding career opportunities in the specialised field of computing and electronics recruitment based at either our London or Reading offices.

If you have recruitment experience then Myriad could offer you the opportunity to progress your career with one of the major companies in this field. However, if you are interested in recruitment but do not have direct experience Myriad may be able to give you the opportunity to train as a Consultant.

With a well established professional reputation we have the scope, resources and expertise to enable you to develop the skills needed to succeed in this challenging and rewarding work. You must have a background in the computer industry, such as programming, analysis or any related sales oriented position. Without this essential grounding you could not be expected to give career advice to applicants or advise clients in major recruitment assignments. You must possess the potential to succeed in highly sales oriented situation in which you will have the freedom to work very much on your own initiative.

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In return we offer an above average remuneration package comprising a five figure base salary, generous guarantee and commission; on target earnings will be c£22,000 per annum with further incentive for over performance, a 2 litre company car and fringe benefits. More than just a high remuneration package, we offer outstanding career progression and above all security to those who are successful.

For further information and immediate confidential interview, contact Chris Fry or Peter Dudgeon on 01 935 0671 (24 hour answering service) or 05827 2354 evenings and weekends.

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to  
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**SOFTWARE/HARDWARE ENGINEER** for the Production Planning Group of a multi-national computer manufacturer. Work will entail hardware performance testing, hardware/software interfacing, evaluation and test. Experience of microprocessors essential. Ideally with a knowledge of BASIC and PASCAL. Spoken German required.

Location: Vienna

Ref: 18/82

## SOFTWARE TECHNICAL AUTHORS:

1. With experience of writing END USER Documentation for a new range of microprocessors and related software currently being developed. Knowledge of PASCAL and BASIC.

Location: Vienna

Ref: 24/82

2. To write software User Manuals for a new micro processor based development and debugging system from engineers performance specifications. Applicants, preferably with a Degree or similar in a numerical subject, should show a knowledge of PASCAL, with BASIC or ASSEMBLER and a strong software writing background.

Location: The Netherlands

Ref: 38/82

**DATA ENTRY CLERK/KEYBOARD OPERATOR** for Trainers Programmer required to edit/print translated screen and print out text etc. Knowledge of modern languages essential.

Location: Vienna

Ref: 48/82

**TECHNICAL AUTHORS/TRAINING OFFICERS** with a background in Process Control and computer engineering to write the systems documentation for a new Analogue/Digital multi-function mini computer based process control machine, and train users and service engineers on the equipment. A knowledge of hardware and software in such an environment, together with spoken German is desirable.

Location: Germany

Ref: 58/82

**HARDWARE TECHNICAL AUTHORS** required to write FIELD SUPPORT, MAINTENANCE and Programming manuals from engineers draft specifications. Applicants must display considerable experience of mini computer peripherals.

Location: Germany

Ref: 68/82

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c. £7500

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Experience of 2900 VMEB is necessary, along with the ability to supervise two other members of staff (a knowledge of George II+ and DME would also be useful). The ability to communicate at all levels is essential.

The ideal applicant will have an appreciation of the day to day running of a Data Control Section, preferably gained through first hand experience.

The company offer excellent working conditions and a structured career path. The current salary will be reviewed in March.

For an immediate interview or further details phone

01-439 6481 quoting ref. BQ4717



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IBM DOS Cobol DL1

IBM DOS Assembler

IBM DOS Assembler CICS

IBM DOS Cobol CICS DL1

IBM DOS Cobol

IBM OS Cobol CICS IMS DB (Southern Home Counties)

IBM OS Cobol CICS (Southern Home Counties & Central London)

IBM MVS PL1 CICS

IBM MVS PL1 CICS (plus IMS DB Design Experience)

IBM OS Cobol Assembler CICS

IBM OS Cobol (East London - February)

IBM VM CMS Cobol

IBM DOS PL1 (or Cobol) Adabas/Natural

IBM OS PL1 (or Cobol) Adabas/Natural

IBM System 38 RPG3

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Systems Programmer  
Systems Programmer  
Analyst/Programmer  
Analyst/Programmer  
Programmers

Analyst/Programmer  
Analyst/Programmer  
Analyst/Programmer  
Team Leader  
Programmer  
Programmer  
Programmer  
Analyst/Programmer  
Analyst/Programmer  
Programmers

## DEC

VAX VMS Cobol (North London - March) Analyst/Programmers  
PDP 11 RSX-11M Basic - 2 Programmers  
PDP 11 RSX-11M Pascal Programmer

## OTHERS

HP 3000 Image View Query Cobol Programmers  
Burroughs B6800 MCP Cobol (Immediate + March) Analyst/Programmers

Wang VS Cobol Programmers  
ICL 2900 DME Minimax RPG2 Cobol Programmers  
ICL 1900 G2 + Maximax Cobol Plan Programmer  
ICL 2900 DME Cobol Programmer  
ICL 2900 LME IDMS Systems Analyst  
Honeywell L66 GCOS Cobol IDS TDS Analysts Programmers  
Honeywell L64 GCOS Cobol IDS TDS Analysts Programmers

## SAUDI ARABIA

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IBM PL1 IMS Analyst/Programmers and Programmers  
IBM MVS Systems Programmer  
IBM Fortran Scientific Programmers  
ICL 2900 IDMS (March) Programmers  
ICL 2900 IDMS VME/B Cobol Programmers

## GERMANY

VAX or PDP 11 (March/April) Systems Programmer  
Burroughs B2830 MCP Cobol (May) Programmer  
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South Herts

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A unique position has evolved for an individual with a good technical background and who can also display administrative abilities. Our client is currently developing a Motorola based system used in professional Film, Video and Audio recording equipment. The recent boom in domestic equipment has precipitated tremendous growth in this area. Candidates should be in their early thirties and be familiar with microprocessor based hardware and software. A knowledge of both Analogue and Digital techniques would be very useful. Reporting directly to the MD, the successful candidate will play a role of prime importance in bringing together a team of development engineers and, according to ones ability and potential, this could lead to some very interesting prospects. This certainly is a unique appointment and quite different from usual project management positions.

ICW19/A1

## CICS, DL/1 Training

Berkshire

to £8,500

Our client, known throughout the world, is currently redesigning and developing its information processing systems, including Invoicing, Receivables, and Rental Transactions, which are used both within the UK and across Europe. We are not looking for heavyweights. Good programmers, with one years COBOL experience, post training, may apply. A knowledge of IBM DOS/VSE, CICS and DL/1, would certainly be a bonus, but the emphasis lies on the ability to program well. This must certainly be considered an excellent opportunity for programmers to gain really good CICS and DL/1 training and should therefore be pursued at once.

ICW19/B1

## Microprocessor & Laser Real-time Control Systems

London/Surrey Border

c.£13,500

Specialising in the design and development of 'total control' systems used in oil exploration and production, our client has enjoyed considerable success and a prodigious growth rate over the last decade. They are currently recruiting a number of programmers and senior level software design engineers to assist in producing real-time microprocessor based systems to control all aspects of safety and loss prevention within the oil field environment. Experience of real-time multi-tasking operating systems, especially using Intel ISBC products is desirable as is a knowledge of top-down system design and block-structured programming techniques. Ideally PL/M or PASCAL. More senior applicants should also possess the ability to supervise and advise programmers in the coding and testing phases and on the interfacing of software to special purpose micro-based hardware. An excellent opportunity to share in the success, and become part of a very progressive company.

ICW19/C1

## Communications Consultant

Berkshire

Negotiable salary

This is a project orientated position with one of the foremost Consultancies. The successful candidate will work on communications aspects of industrial and basic software, including device drivers, emulators, etc. Opportunities will include work on wide area networks like PSS and multi-access systems or, alternatively, Cambridge Ring, Ethernet and Broad Band local networks. Applicants must naturally be willing to be mobile, in keeping with consultancy work, and have the appropriate background. This will be in areas of real-time operating systems, e.g., RIMX/80, RSX 11M and real-time languages such as CORAL 86, RTL/2 and PASCAL. Some exposure to implementation of high level protocols and transport services will be very useful. This could be your chance to move up a notch in the communications consultancy field.

ICW19/D1

## IBM Development/Financial Applications

Berkshire

to c.£12,000 + generous package

Modus is in the process of recruiting several individuals to play key roles within a newly planned departmental structure. This has not, however, been finalised and is very much dependent on the calibre of candidates recruited, but positions exist for programmers and analysts at all levels, including a Database Administrator. Analysts should have a knowledge of top-down structured techniques, preferably with an IMS db background. Programmers should be fluent in COBOL, using modular, structured techniques. Again a knowledge of IMS db would be advantageous. Generally, an understanding of any of the packages in use would be an added bonus and these include: VM/370 Virtual Machine Environment, OS/VS1 operating system, IMS database, CMS, SP, Metacool and Easytrieve etc. Competitive salaries supported by an excellent package, including a 5% subsidised mortgage in most instances, must be very tempting.

ICW19/E1

STOP PRESS!  
STOP PRESS!  
STOP PRESS!

We are seeking several COMMUNICATIONS DESIGNERS for consultancy work in and around London and also anybody (at any level) with UNIX experience. Many of our technically orientated clients are seeking Hardware or Software MICRO ENGINEERS. We have PL/1, CICS vacancies in Brussels.

ICW19/F1

Consultants: Mike Creamer or David Walder

If the advertised positions do not match your experience or aspirations, the Modus Consultants are always available for a confidential discussion of other vacancies available. An informal meeting - often an essential part of the process - can be quickly arranged.

## International Personnel Consultants Modus Management Services Limited

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Telephone: Radlett (09276) 3077

## Network Software Development

Bedfordshire

£8,000 to £11,000 +

One of the significant features of the powerful range of mini-computers manufactured by this company is the quality and resourcefulness of the systems software. There are plans for considerable growth during 1982 with an emphasis in the areas of communications and networking; new staff are required to research into and develop products for these facilities. Network management and distributed terminal handling software, providing the user with a terminal independent system, form the basis of the main projects. Applicants must have a minimum of two years experience, preferably from a software design and development environment. High-level languages are essential, particularly the more structured and portable variety, and if this experience is supported or accompanied by a communications background so much the better. One vacancy exists for a 'network guru' where the appointee will be acclaimed as one of the leading lights in the project team.

ICW19/G1

## Process Control Specialists

West End + lots of travel

c.£9,000-£15,000

Modus has been approached by a consultancy with a reputation for the highest degree of excellence in the art of real-time process control using mini and micro computers. Expertise is required at all levels, from Programmer/Analyst to Consultant, but only the best will be good enough. The company has offices in the UK and in Europe, with on-going projects both at home and abroad so, applicants must be willing to travel. Complete fluency in a low level language is essential. A knowledge of any of the following would be desirable: PDP 11/34 (RSX-11M) DG Novae, Honeywell X16, Argus 700, Zilog Z80, Intel 8080, Fortran, Coraf 66, RTL/2, Pascal or Algol. A good general understanding of hardware is also necessary. Salaries are well above average and completely negotiable with profit sharing and other benefits - our clients sole concern is to get the best talent available - if you have it, contact us now.

ICW19/H1

## Systems Support Programmers (RDOS)

South Middlesex

up to £12,000 + car

Terrific opportunity to apply creative talent to the development and support of software for a new and unique system, built around Osta General hardware and incorporating micro computers in a network configuration. Close liaison with the business development group and the UK/European marketing sector will be necessary, as well as the planning and support of the systems software. Candidates must have a solid background in Assembler, with the more senior vacancy requiring in-depth RDOS knowledge coupled with some FORTRAN programming skill. Desirable experience will be Intel or Zilog development in Assembler with, preferably, some exposure to communications networks. An ex-Field Service Engineer or troubleshooter, for example, who has progressed into systems and programming would be ideal.

ICW19/I1

## Project Leaders (DG Experience)

North London

c.£10,000 + package

Currently celebrating its 10th successful year our client is seeking Project Leaders who would like involvement in consultancy work and the chance to become involved in the design and development of Data General based commercial systems. Candidates must be flexible and be capable of carrying projects through from the initial feasibility study through systems analysis, design and programming to the final installation, including budget and time estimates and in-depth customer liaison. A knowledge of COBOL end/or Basic is essential, and previous DG experience would naturally be an asset. The company are not necessarily looking for heavyweights; so if you have the potential to lead and manage projects, then your experience could well be of interest.

ICW19/J1

## Programmer - Consultants (Just 2 yrs + COBOL)

London/Home Counties

From £7,000

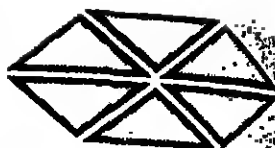
Several of our clients are seeking fairly junior programming talent, particularly if accompanied by a strong desire to pursue a consultancy approach to career progression. In the main, the companies concerned are not insisting on experience of a given size or type of computer system, merely sound training and a stable track-record of structured COBOL programming. Obviously, extra experience of databases, real-time environments, and proprietary packages or TP systems are added advantages. Applicants who would like to learn more about opportunities or explore the route into consultancy should call us, with a view to meeting one of our Consultants for a more detailed discussion either at our offices or in London.

ICW19/K1

ICW19/L1



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Imm.

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London

Imm.

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Various

Jan, Feb, Mar

## \* SYS 38 PROGS

N.H. Counties

Imm.

## \* L6 SCREENWRITE

London

Feb.

## \* VAX BASIC & COBOL

H. Counties

Feb/Mar.

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Berks.

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## \* WITH MINIMAC

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## Technical Support S/W

E. Berks c. £11K + car

A growing, successful computer product line requires a number of systems specialists to work in pre-sales support. Ideally you will have a varied background in terminal or minicomputer support. Previous experience will include programming at assembly level. A knowledge of telecommunications protocols would be an advantage. Self presentation skills important.

## Data Dictionary S/W

Beds £8K - £11K

Join the expanding software development group of a major international computer manufacturer. There are opportunities for a number of experienced programmers to join a team working on data dictionary development. Ideally you will be experienced in D.B.M.S., have COBOL experience from commercial beginnings but seek a future in systems software. Relocation assistance where necessary.

## Recruitment Consultant

Amersham

If you are bright with a friendly gregarious nature and have sound experience gained in the computer industry, you could be suited to a career in recruitment. You must have confidence in dealing with people at all levels and be interested in helping others. Training is provided. Attractive earnings are totally relating to effort. In the region £10K to £16K +.

## Sales Engineers

Bucks/Herts to £10K + car

Young, presentable, outgoing personality? You could be enjoying a successful and rewarding career in sales. Previous selling experience not essential. A number of positions exist in the rapidly expanding data communications market, from sales preparation to sophisticated micro based test equipment. HNC to electronics degree preferred qualifications. Relevant experience taken into consideration.

## Technical Support H/W

W. Berks c. £11K + car

The product range and reputation held by this client has made it a world leader in the highly competitive and expanding field of data communications. Candidates must have detailed technical knowledge of modems, multiplexors, data concentrators etc., plus a suitable client relation manner. Product training provided. An excellent opportunity for advancement.

## Database Consultancy

London c. £12,000

Candidates for this position must have the right mix of technical experience and client relations skills. Ideally you will have a knowledge of IBM machines. The work entails consultancy on database systems, performance monitoring with some market research and product planning. Some short term travel. Age 25-35. Future in consultancy or management.

## Process Control S/W

Herts £8K to £11K

A number of programmers with real time experience are required by a company long established in industrial process control. You should have minimum 2 years experience using Fortran, Assembler or Basic. Senior positions will require process control experience. Some overseas travel for installation, or support visits. Attractive company benefits including relocation assistance.

## IBM Applications

Berks c. £10,000

Experienced IBM programmers are required by a major international company which is experiencing remarkable growth as a result of product excellence. The immediate requirement is for COBOL expertise in financial systems. You will provide product support and enhancement with the prospect of development work in the future as further expansion takes place.

## HP 3000 Programmer

Bucks to £8,000

This is an excellent opportunity to join a young, enthusiastic team which has embarked on the development of business applications for the company. Ideally you will have a minimum of one year's COBOL experience plus a good working knowledge of H.P. Software (IMAGE, V/3000 etc.). The company is a subsidiary of a major international organisation.

## Sen. Programmer Technical

Herts to £11,000

The technical applications group of an expanding minicomputer company is seeking additional experienced programmers to work on an interesting range of applications (Comms., medical aerospace). Suitable candidates will be given team leader responsibility. You will require good personal communications skills and development experience in COBOL or similar. Systems house background an asset.

Apply in confidence to Terry Harvey by sending personal and career details, or contact him for an application form, evenings 6t. Miesenden (02406) 4705 or daytime as below.

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**HR**

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## M.E.P. SECONDARY DEVELOPMENT OFFICER

A person is required for a part-time post to co-ordinate the work of two programmers, and later with teachers in schools, in the development of software as part of the Microelectronics Education Programme. The appointment is for two years. It is expected that the successful applicant will have recent teaching experience and some knowledge of the use of computers in schools. Salary will be pro rata on the Senior Lecturers Scale (Summit F.E.). Application forms and further information from the Deputy Bureau, Homerton College, Cambridge. Closing date for applications: 30th January. (10099)

## UNIVERSITY COLLEGE CARDIFF COMPUTING CENTRE

Applications are invited from graduates for the post of COMPUTER OFFICER. The post is in the development of the new Microelectronics Education Programme. The successful applicant will be responsible for the development of software as part of the Microelectronics Education Programme. The appointment is for two years. It is expected that the successful applicant will have recent teaching experience and some knowledge of the use of computers in schools. Salary will be pro rata on the Senior Lecturers Scale (Summit F.E.). Application forms and further information from the Deputy Bureau, Homerton College, Cambridge. Closing date for applications: 30th January. (10099)

## IMMEDIATE REQUIREMENTS FOR PERMANENT AND CONTRACT STAFF

### MIDLANDS

Programmers - ICL COBOL VMEB IDMS  
Programmers - IBM RPGII SYSTEM/34  
Programmers - IBM COBOL CICS  
Analyst Programmer - IBM COBOL CICS DL1  
Systems Analyst - On-line manufacturing background

### NORTH & SCOTLAND

Systems programmer - IBM 3031, 3033  
Senior programmer - ICL COBOL VMEB IDMS  
Systems programmer - Burroughs 7700, 7800

These represent a small selection of the opportunities currently available for permanent and contract staff. For more details on these and a wide variety of other vacancies contact VAL LACKENBY on 021-632 5111

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(Male/Female)

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HALLIBURTON MANUFACTURING AND SERVICES LTD

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ARBROATH DD11 2NF, SCOTLAND

Telephone Arbroath 77333 (10107)

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SALARIES c. £11,000 + car and various other benefits. A number of vacancies exist for people who are probably field engineering supervisors at present, aged 25-35, with good qualifications and currently with major/minor computer manufacturers or distributors.

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to Computer Weekly

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The successful applicant will take on full responsibility for the development of the Management Information System.

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## ICL/TOPS COURSE GRADUATE, MALE, AGED 21, SEEKS POST AS COMPUTER PROGRAMMER-TRAINER

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Lake District

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You will

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You must be an experienced Programmer with 2-3 years' relevant experience, fully conversant with Cobol and at least one other language and educated to 'A' level standard or equivalent. You will be required to play a key role in the development and maintenance of a wide range of systems.

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For an Application Form please contact: Mrs. Jean Jupp, Recruitment and Training Officer, K Shoes Limited, Kendal, Cumbria. Tel: Kendal (0539) 44343

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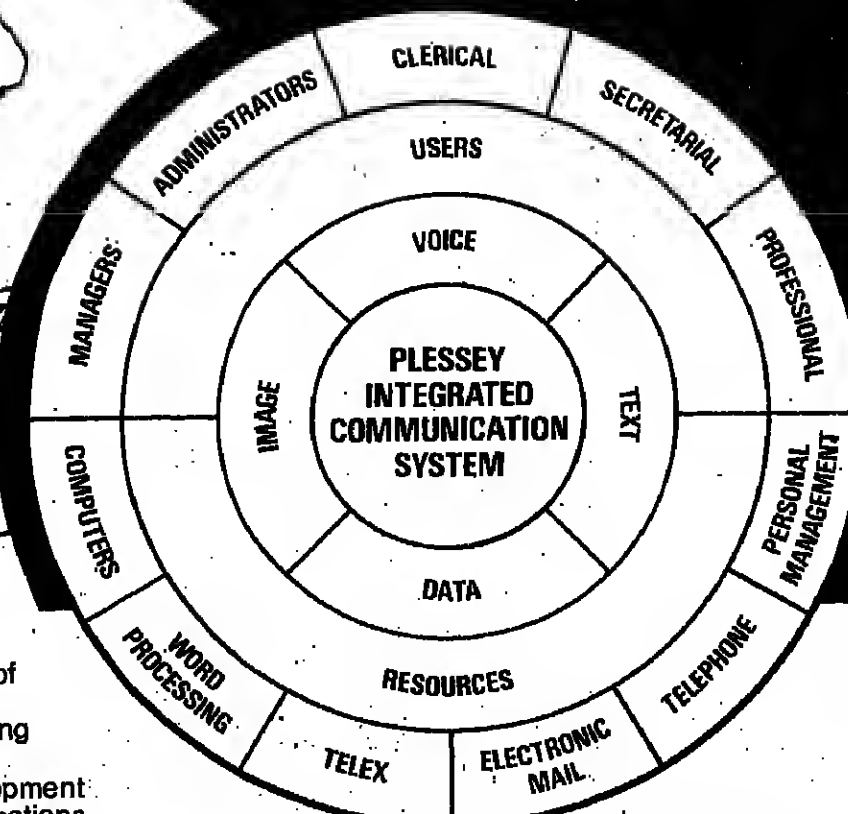
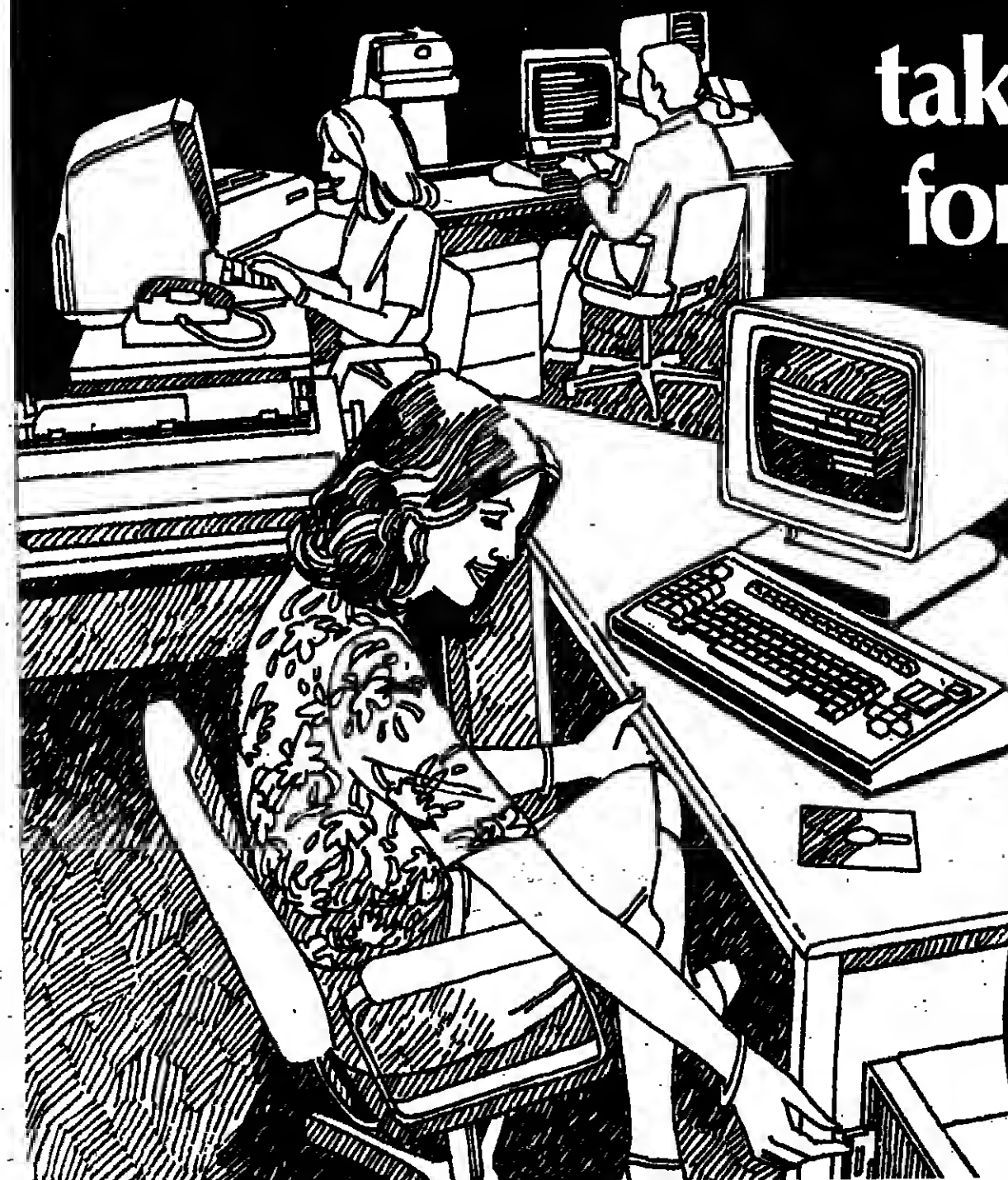
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These posts are open to software specialists who have 5 to 15 years relevant experience in the design and implementation of data communications, operating systems, word processors, electronic mail and office filing systems. The ability to undertake a project effectively from feasibility through implementation to release with the minimum of direction is essential as is, in the case of Team Leaders, the ability to manage with confidence and knowledge. We are also seeking candidates who wish to develop their skills in local area network design, electronic filing systems, and user office products and development aides.

Salary will depend on experience and will also reflect the value we place on the skills we require and our appreciation of their value in the job market. Our remuneration package includes paid overtime - even at management grade, assistance with relocation where applicable and for senior positions BUPA membership.

We are situated within the attractive university City of Nottingham where housing is reasonably priced and there are first class social, educational and recreational facilities.

**PLESSEY**

To apply and to receive comprehensive details of the Company, its activities and location, please fill in the Quick Response Coupon and post to: Bob Elsdon, Plessey Office Systems Limited, Abbeyfield Road, Lenton Industrial Estate, Nottingham NG7 2SZ, or telephone for an informal discussion on Nottingham (0602) 866522 extension 2232 or in evenings and at weekends telephone Garth Shephard on Bottesford (0949) 43210.

Plessey is an equal opportunity employer.

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Name \_\_\_\_\_ Age \_\_\_\_\_

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The Company has modern, well equipped offices and offers a comprehensive benefits package which includes a contributory pension scheme and relocation assistance where appropriate. If you are interested to learn more about these opportunities please apply in confidence to Terry Harvey by sending personal and career details, or contact him for an application form, evenings, Gt. Missenden (02406) 4705 or daytime as below.

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We now have a number of key positions to fill in our teams concerned with the development of the next generation of visualisation software. We need software which will allow models and scenes to be assembled and manipulated interactively. From this computer stored data, it will be possible to produce on full colour frame store displays, highly realistic hidden surface views of the models.

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**Computer Aided Design Centre**

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Calling all operations personnel, we have clients looking to fill positions from Operator up to Shift Leader status. If you have more than a year's experience on DOS or OS contact Datascene Now!

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Various part of the Xerox Group, is a California-based company supplying high technology electronic computer peripherals for scientific and commercial applications.

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We are therefore looking for the following engineers to complement our existing teams.

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£9 - 12K BASED NEWBURY, UK

This position requires an innovative person with considerable experience of operating systems and applications software in the graphics field, and competence in the use of Fortran.

The person appointed will be responsible for pre and post-sales support in this new role.

For European positions please telephone Stella Corrigan on Newbury (0635) 31221 for an application form.

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You will control a small team covering data control, data preparation, file maintenance and transmissions to a bureau for processing.

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So you see, to us, your future is just as important as the role you will fill now.

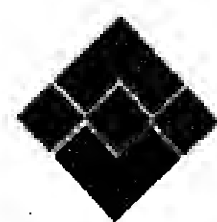
Both positions will appeal to people in their mid to late 20's but we are open minded on this. Career opportunities within the Group are very good, and as a modern, progressive company our facilities and benefits are excellent. For further details and an application form please telephone Bob Collison on 01-377 0020, between 9.00 a.m. and 5.00 p.m.



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IBM 360/370, 303X,  
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COBOL, BAL, ALC

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All applicants will be expected to have a programming background. Minimum experience required for Programmers is 2 years.

If you can identify your skills with the hardware mentioned and have a good knowledge of at least one of the languages and

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GROUPE  
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with a flexible approach toward their career progression.

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HONEYWELL LEVEL 66

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(based in Germany)

ideally some of the software quoted, we would like to hear from you.

In addition to the experience required if you have a good knowledge of German or French it will be a definite advantage.

Ref. No.: RN123



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The successful applicant for this important position will have overall responsibility for marketing and sales. We would, therefore, expect suitable candidates to have a minimum of five years' sales management experience plus at least two years' marketing experience in a relevant field, and to have achieved considerable success in both areas.

There are two important things you should know about this job.

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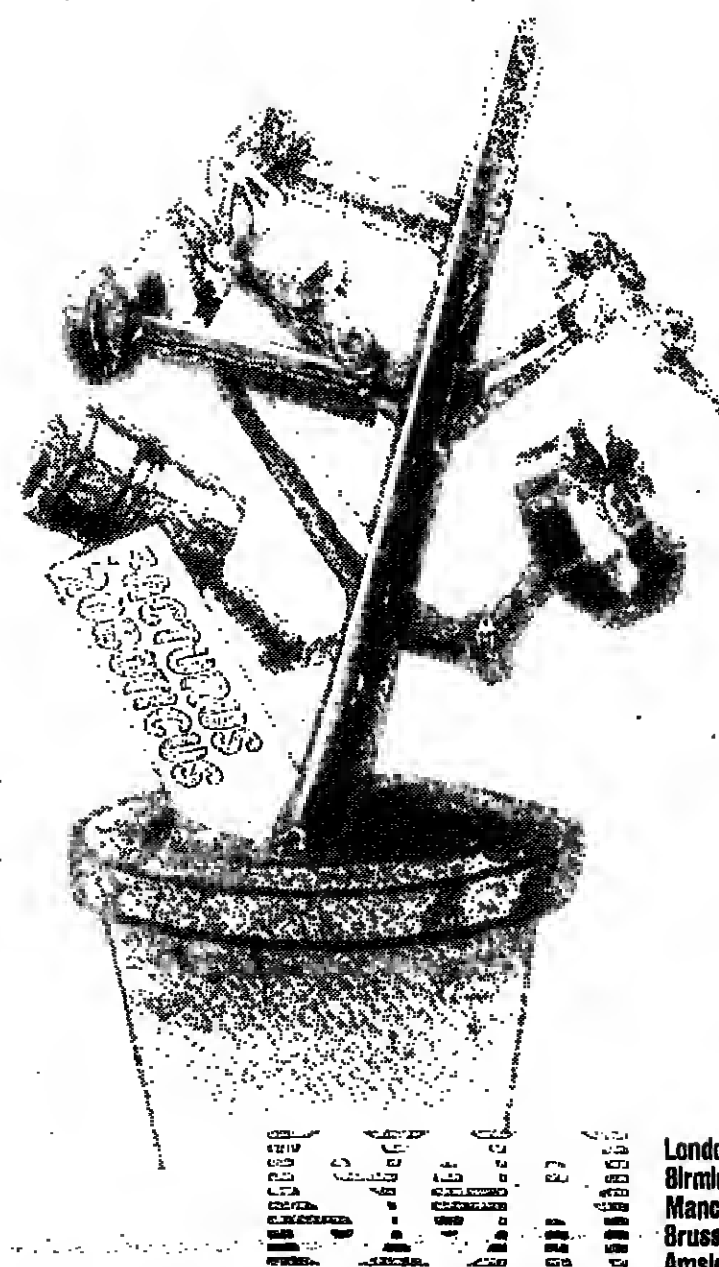
- 1. good educational qualifications, preferably degree level in a technical discipline
- 2. successful overseas marketing experience in at least the USA and Europe
- 3. comprehensive understanding of computer technology
- 4. well developed creative and communication skills
- 5. the ability to forcefully and authoritatively represent the company in public
- 6. personal energy, initiative, determination and enthusiasm.

Finally, Research Machines attaches great importance to its responsibilities as an employer. This is characterised by a team spirit, a policy of management, a positive policy of fostering the career and skill development of all its employees, and a lack of status consciousness. As a senior member of our team, the marketing manager must share this corporate philosophy.

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If you are interested in this exceptional vacancy please contact Ann England, (telephone 0865 226136), quoting CW. The position is open to both male and female applicants.

RESEARCH MACHINES  
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## We've something new in Plant Automation.

DEC Hardware Technician  
1971/1972 plus car South Midlands

As a major exporter, we appreciate more than most Corporations the value of maintaining a competitive edge in the challenging area of manufacturing automation. Our successes to date have made a dramatic impact on productivity and quality and we are now poised to commence a NEW PROJECT in our SOUTH MIDLANDS MANUFACTURING COMPLEX.

Our brief calls for a Technician who combines a relevant degree with a minimum of five years post graduate experience gained in a manufacturing control environment. The essential experience we seek is a practical hardware familiarity with DEC PDP 11 Series and LSI 11 Series mini and micro computers used in industrial applications. A good understanding of complex interface problems, particularly in the data capture areas using Programmable hand held Logic Controllers is also vital.

Experience of communications and duplexing we see also as highly desirable, particularly under RSX 11M operating system.

In return for these skills we can provide a solid long-term career opportunity with a major manufacturing force, committed to this advanced technology. In addition to a competitive, negotiable salary and car scheme, we provide a contributory Pension Scheme and a first class relocation package for qualifying candidates.

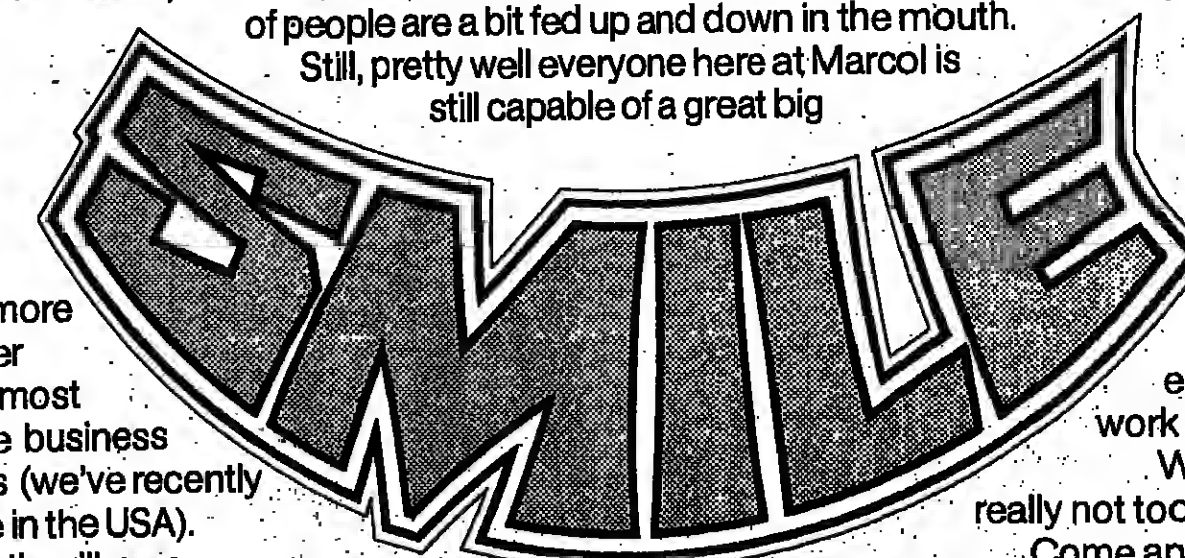
Applicants wishing to discuss these opportunities in greater detail are invited to telephone Alan Carnall on 021-236 3781 (24 hour answering service) or 021-784 6063 (Evenings and Weekends). Candidates who wish to submit their own CV should do so via our Birmingham Office.

London 01-935 0671 & 01-486 0461 James House, 46 James Street, London W1M 5HS.  
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Brussels 010 322-840 7151/71 Avenue Louise 327, Boile 4, 1050 Bruxelles.  
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Specialist Computer Recruitment Ltd

## What a start to the New Year!

With sleet, blizzards, floods, all kinds of disasters plus strikes it's no wonder a lot of people are a bit fed up and down in the mouth. Still, pretty well everyone here at Marcol is still capable of a great big



That's because The Marcol Group is expanding, there are more opportunities than ever before to work on the most exciting projects in the business at home and overseas (we've recently opened our first office in the USA). Our people know they'll own

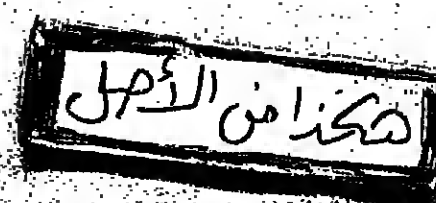
shares in the company after two years, that their careers are progressive, exciting, permanent and that enthusiasm, talent and hard work are properly rewarded. With a future that bright it's really not too difficult to raise a smile. Come and join us.

**From Programmers to Senior Consultants. Salaries up to £17,500.**

CICS, Cobol VME/B, Cobol

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## Career Appointments

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### Junior Operators Guildford £4.5K

Good opportunity for person wishing to join a company that provide excellent Operations training. Ref: KR420/CW. Contact Keith on 01-836-8411.

### Operation Controller N. Midds Approx £7K

3 years minimum experience DOS VS preferably. Responsible position to liaise with scheduler and help with the set up of JCL. Supervisory capabilities useful. 4341 site. Ref: MM448/CW. Contact Madeleine on 01-836-8411.

### Shift Leaders Cheshire £7.5K

Minimum 2 years supervisory experience.

### Operators Cheshire £5-£5.5K

Minimum 1 year experience.

### Data Controller/Operator Cheshire £4.5-£5K

Minimum 1 year experience.

The OS2000 site moving from Essex. 3 shift pattern - 2 per shift. Relocation allowance. Ref: DF450/CW. Call Diana now on 01-836-8411 regarding the above positions.

## & Contract Assignments

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Contact Liz on 01-836-8411 regarding the above contract requirements.

## for Operators in UK & Overseas

For details of ☐ contract ☐ permanent work mail this coupon to CoOperators, Freeport (no stamp) VLI House, 68 St. Martins Lane, London WC2 4BR.

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Nick Donovan on Leeds (0532) 702211 or write to:-  
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Present job title/position and nature of work: \_\_\_\_\_

present salary £ \_\_\_\_\_ p.a. (if you wish to state) \_\_\_\_\_  
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Computer languages \_\_\_\_\_

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## Real-Time Programmers

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Our client is a Systems and Software House with its Head-Quarters in Central London and subsidiaries based in several European locations. Its excellent reputation within real-time applications has led to the acquisition of many lucrative projects in London and Continental Europe. Consequently, additional Real-Time Programmers are required. Suitable candidates will have a minimum of two years programming experience in at least one high-level language, preferably PASCAL and, additionally, be fluent in an Assembler. Whilst knowledge of particular hardware is not important, respondents with exposure to DEC PDP11, or any micro computer will be especially favoured. Applications areas of interest will be Process Control, Message/Package Switching or Data Communications. Ref: L/2/A

## Jnr. C & UNIX Programmers

Greater London : Salary to £9K

An internationally recognised supplier of Hardware and Software Systems has several requirements within a newly created operating division. Suitable respondents, preferably aged 22-27 years should hold at least one numerate degree and be fluent in C, BCPL or PASCAL. Those who can combine this fluency with an understanding of Assembler will be invariably considered. Of national interest will be those who have current or very recent direct involvement in a systems development role on any recognised 16-bit microprocessor running under UNIX or CPM. Although the work content is essentially in-house, at least upon appointment, a degree of mobility is essential for client visits to national and international sites during implementation and subsequent running. Ref: L/2/B

## Systems Design

Herts : Salaries to £10.5K

A leading supplier of hardware and software systems, with Head-Quarters in rural Hertfordshire, has an immediate requirement for additional Systems Engineers. Suitable applicants will hold a numerate degree and offer at least two years industrial experience in one or more of communications, networking, firmware design and microprocessor technology. It is essential that you possess good written and oral communication skills and enjoy customer contact. As a member of the Systems Department you will be involved in the design and installation of hardware and systems software. Particular fields of activity will include data-communications, networking and terminal interfaces and logic/circuit design. Ref: L/2/C

## Communications Engineers

Bedfordshire : Salaries to £15K

A number of Communications Engineers from Programmer to Project Leader level, are required for the Research and Development facility of a U.S. owned computer manufacturer. Suitable applicants will, preferably, be currently employed in a development capacity with either a systems house or manufacturer. Particular technical skills should include at least 2 years experience of a high level language, preferably PL/I, PASCAL or CORAL in a data communications or networking environment. For the more senior positions it is essential that respondents are familiar with X25 protocol techniques and also have been a senior member of a design team developing at least one major system providing shared communications functions. Ref: L/2/D

## Technical Instructors

Thames Valley : Salary to £11K

As a result of recent sales successes, a recognised supplier of Microprocessor based products is seeking several Technical Instructors and Lecturers to supplement its existing training department. It is a prime requirement for all candidates to hold at least one numerate degree and additionally, to have post-graduate experience of 3-5 years with a Systems Supplier or Microprocessor Development House. Ideally, candidates should offer hands-on experience in the areas of software interfacing, drivers, protocols and diagnostics whilst for certain positions an appreciation of MICROVAX hardware would be especially welcome. Naturally, good oral and written skills are imperative in conjunction with an easy-going and business minded personality. Ref: L/2/E

## Fortran Programmers

N. Home Counties : Salaries to £9K

A long established engineering systems supplier based in the North-West, Home Counties has an immediate requirement for additional Fortran Programmers. Suitable applicants will have a minimum of six months post-graduate programming experience in a real-time mini computer environment. A knowledge of CAD/CAM techniques, whilst not essential, would be considered very useful. These positions represent outstanding opportunities for applicants who wish to be involved in the design and development of complete systems in the engineering industry. Particular projects in which the Company is currently involved are Mechanical Drawing, Graphics, Production Control and I.C. Design. Ref: L/2/F

## Digital Engineering

Thames Valley : Salaries to £15K

Several vacancies for Senior Project Engineers have arisen in the PASCAL, and a development facility of a leading computer manufacturer. Suitable applicants will possess an H.N.C. or, preferably, a degree in Electrical and/or Electronic Engineering, followed by at least four years in industry. Experience should have been gained in the fields of digital design and engineering with a strong emphasis on circuit and logic design. An ability to program in PASCAL, and a knowledge of the internals of at least one operating system, whilst not obligatory, would be very welcome and, also, will attract a salary premium. It is, however, essential that all respondents have had experience of managing a small project team. Ref: L/2/G

## Pascal Programmers

Home Counties : Salary to £11K

A leading supplier of Business and Communications Systems has a requirement for a number of PASCAL Programmers. All respondents, preferably aged 22-30 years, should offer a minimum of one years post-graduate industrial experience in an environment where PASCAL has been used as the major programming language. You will probably be employed as either a Software Engineer or Junior Applications Programmer within a Systems or Software supplier. Our clients can offer a number of diverse opportunities within its various operating divisions covering such technical areas as the design and implementation of financial management packages, data communications networking or the development of the home and hobbyist computing markets. Ref: L/2/H

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